Royal Docks Business School

UEL University of East London

MKM227 Postgraduate Dissertation

Student Number: u1218076

	Comments	Max Mark	Actual Mark
Introduction *Identification of a valid topic, research question and objectives framed to Masters Level standard with academic rationale developed, clear industry contextualisation of the research topic*	Supervisor Comments:	10%	
	2nd marker Comments:		
Critical Literature Review *Depth and breadth of*	Supervisor Comments:	25%	

literature search, engagement with seminal authors and papers, evidence of a critical approach toward the scholarly literature	2nd marker Comments:		
Research Methodology *Evaluation of research philosophies and perspectives. Justification of methodological approach, sampling strategy, data analysis and reliability and validity measures as applicable*	Supervisor Comments:	15%	
	2nd marker Comments:		
	Supervisor Comments:	35%	

Data Analysis and Interpretation *Evidence of rigor in data analysis and interpretation procedures, identification of key patterns and themes in the research data, integration of academic theory into explanation of findings*			
	2nd marker Comments:		
Conclusions and Recommendations *Research question and objectives addressed with implications to theoretical and managerial concepts considered. Recommendations provided for theory, practice and future research*	Supervisor Comments:		
	2nd marker Comments:	10%	

Organisation, presentation and references. *Well structured and ordered dissertation with correct use of grammar and syntax. In-text citation and bibliography conforming to "Cite Them Right"*	Supervisor Comments:	5%	
	2nd marker Comments:		
Total	First Marker Total	100%	
	Second Marker Total		

Supervisor General Comments:	Agreed Mark:
2nd Marker General Comments:	

Supervisor's Name: …….. **Signature:** ……

2nd **Marker's Name:** ……. **Signature:** ……

IS IT WORTH IT TO INVEST THROUGH FUND MANAGERS?

TEST OF MONTE CARLO SIMULATION ON UK, USA, GERMANY, EUROPE, NIGERIA AND EMERGING MARKET FUNDS.

(2008-2012).

A dissertation submitted in partial fulfilment of the requirements of the Royal Docks Business School, University of East London for the degree of Masters in Finance and Risk

September, 2013

15,187

I declare that no material contained in the thesis has been used in any other submission for an academic award

Student Number: U1218076 Date: 03/09/2013

Dissertation Deposit Agreement

Libraries and Learning Services at UEL is compiling a collection of dissertations identified by academic staff as being of high quality. These dissertations will be included on ROAR the UEL Institutional Repository as examples for other students following the same courses in the future, and as a showcase of the best student work produced at UEL.

This Agreement details the permission we seek from you as the author to make your dissertation available. It allows UEL to add it to ROAR and make it available to others. You can choose whether you only want the ***dissertation seen by other students and staff at UEL ("Closed Access") or by everyone worldwide ("Open Access").***

I DECLARE AS FOLLOWS:

- That I am the author and owner of the copyright in the Work and grant the University of East London a licence to make available the Work in digitised format through the Institutional Repository for the purposes of non-commercial research, private study, criticism, review and news reporting, illustration for teaching, and/or other educational purposes in electronic or print form
- That if my dissertation does include any substantial subsidiary material owned by third-party copyright holders, I have sought and obtained permission to include it in any version of my Work available in digital format via a stand-alone device or a communications network and that this permission encompasses the rights that I have granted to the University of East London.
- That I grant a non-exclusive licence to the University of East London and the user of the Work through this agreement. I retain all rights in the Work including my moral right to be identified as the author.
- That I agree for a relevant academic to nominate my Work for adding to ROAR if it meets their criteria for inclusion, but understand that only a few dissertations are selected.
- That if the repository administrators encounter problems with any digital file I supply, the administrators may change the format of the file. I also agree that the Institutional Repository administrators may, without changing content, migrate the Work to any medium or format for the purpose of future preservation and accessibility.
- That I have exercised reasonable care to ensure that the Work is original, and does not to the best of my knowledge break any UK law, infringe any third party's copyright or other Intellectual Property Right, or contain any confidential material.

- That I understand that the University of East London does not have any obligation to take legal action on behalf of myself, or other rights holders, in the event of infringement of intellectual property rights, breach of contract or of any other right, in the Work.

I FURTHER DECLARE:

- That I can choose to declare my Work "Open Access", available to anyone worldwide using ROAR without barriers and that files will also be available to automated agents, and may be searched and copied by text mining and plagiarism detection software.
- That if I do not choose the Open Access option, the Work will only be available for use by accredited UEL staff and students for a limited period of time.

/cont

Field Name	Details to complete
Title of thesis *Full title, including any subtitle*	IS IT WORTH IT TO INVEST THROUGH FUND MANAGERS? *TEST OF MONTE CARLO SIMULATION ON UK, USA, GERMANY, EUROPE, NIGERIA AND EMERGING MARKET FUNDS 2008-2012.*
Author *Separate the surname (family name) from the forenames, given names or initials with a comma, e.g. Smith, Andrew J.*	Ajidahun, Adebola Oluwakemi
Supervisor(s)/advisor *Format as for author.*	Dr. Peiyi Yu
Author Affiliation *Name of school where you were based*	University of East London
Qualification name *E.g. MA, MSc, MRes, PGDip*	MSc Finance and Risk
Course Title *The title of the course e.g.*	Finance and Risk
Date of Dissertation *Date submitted in format: YYYY-MM*	2013-09
Do you want to make the dissertation Open Access (on the public web) or Closed Access (for UEL users only)?	Open ■ Clos ☐

By returning this form electronically from a recognised UEL email address or UEL network system, I grant UEL the deposit agreement

detailed above. I understand inclusion on and removal from ROAR is at **UEL's discretion.**

Name: Adebola Oluwakemi Ajidahun

Signature: Adebola O. Ajidahun Date: 2013-09-03

ROYAL DOCKS BUSINESS SCHOOL

POSTGRADUATE DISSERTATION
SMM227

PROGRAMME: (MSC) FINANCE AND RISK

STUDENT NO: U1218076

PAPER ID: 25745043

DUE DATE: 3rd September, 2013

WORD COUNT: 15,187

Abstract

In the wake of financial crisis, many investors are faced with the uncertainty in investment decision as a result of the volatility in the market. In an attempt to reduce this risk of uncertainties, investors have therefore provided different method of risk management.

Past studies has shown the importance of fund managers in the management of funds while some proves that fund managers are not necessary in investment. This study carries out an in depth analysis in answering the questions asked by investors; is it worth it to hire a fund manager in investment in funds? This study tests the use of Monte Carlo simulation method on mutual fund data in a practical way.

The research studies mutual funds in the United Kingdom, United States of America, Germany and Nigeria.

The study also went ahead into analyzing emerging market funds and European fund to create an in depth analysis of mutual fund and its performance. It also shows how an efficient portfolio construction can help investor's portfolio and provide positive returns despite the volatile stock market conditions. The study was carried out giving emphasis to the importance of diversification. The result arrived at after the Monte Carlo simulation was applied to mutual fund data were organized in form a histogram in tabular form in other to carry out a precise analysis on the result of the simulation.

This study however concludes that it is possible to outperform the market index, even though it occurs in rare cases. The research was also able to find out that investment decision on choice of securities depends on the risk tolerance of the investors.

Acknowledgement

I would like to thank Dr. Peiyi Yu my dissertation advisor for the support, guidance and encouragement in the course of this research.

I also want to thank my parents, Dr. and Mrs Ajidahun for their love and support. My appreciation also goes to my siblings for their encouragement.

Finally, I will like to thank Muyiwa who has helped me to remain dedicated to complete this Masters degree.

Table of Contents

List of Figures

List of Tables

The stock market is a vital aspect of the economy. It is one of the indicators of economic progress and could serve as a pointer to potential financial crisis or otherwise. Several studies in the past have shown investment in funds as a source of long-term profitable investment in the financial markets. These investments usually come with risk.

Financial portfolio management has been a means for investors to create a risk-return balance in the market with the use of selected risk management method to maximize return at the least possible risk.

There are majorly two types of investors: the risk-averse investor and the risk neutral investors. The risk neutral investor is an investor that is indifferent or insensitive about the degree of risk that he is likely incur in his investment while a risk-averse investor prefers a less risky investment and he can only take on risky securities if the expected return is high enough to cushion the adverse effect of the involved.

Keith Pilbeam 2010 (p158) defines a risk-averse investor that given the same expected return an investor will show preference for a security with less risk while a risk neutral investor will be indifferent about the level of risk at a given level of expected return.

Therefore, a risk averse investor has no fear for excess or positive returns but seeks to avert or reduce to minimum the negative effect volatility in the stock market might have on expected returns. In the situation of strong economic conditions and market volatility, risk management has been a means of achieving expected returns while cushioning the adverse effect market volatility might have on expected return. A risk-averse investor is involved in the active management of investment.

An investor might need the help of experienced investment professional/financial intermediaries in allocating funds into profitable securities. This depends on the type of management the investor is involved in that is, the active management of fund or passive management of funds.

The dictionary of finance and banking (2008) explains ''active management of funds as a process of portfolio management where singular investments are chosen with the intentions of earning an excess or abnormal returns while a passive management of investment refers to the type of investment where an investor involves in holding assets over a long period of time and in many cases tracking the market index''.

The active management of investment involves active monitoring and evaluating the market and making decisions on the evaluation of the prevailing market on the best funds to include in the portfolio created to minimize risk.

However, due to limited knowledge on the market some individual investors need the help of fund managers in managing their funds using their expertise.

These financial intermediaries make use of various innovations such as arbitrage innovation, market-broadening innovations, pricing innovations, marketing innovations and risk-management innovations via diversification and divisibility. An example of investment that is characterized by its nature of diversification is the mutual fund.

Over the years, theories have been established relating to the importance of fund managers. Some ordinary investors believe the market can be outperformed which is contrary to the theory of efficient market hypothesis which assumes a perfect market where arbitrage opportunities are not possible. Investors who perform passive management of funds invest directly in the stock market index mostly without the help of a fund manager believing the market cannot be outperformed.

Investing through a fund manager would provide opportunities for smaller venture who cannot afford to invest in a fund on their own would add their fund to a pool of funds.

Therefore, the goal of this research is to

1. Determine whether there is a need for the expertise of a fund manager in the investment management and decisions in investing in funds
2. Determine if ordinary investors in the stock market can beat fund performance.
3. Decide while testing the Monte Carlo simulation method the best kinds of funds to invest in terms of their location/countries
4. Outline and probe into the factors that affect funds performance.
5. mutual fund performance using the Monte Carlo simulation method and to find out if ordinary investors can

1.1 Justification of Research

Since the existence of the banking sector, both the public, corporate and retail investment market have been dominated by the banking industry either nationally or internationally.

However in recent times investors shifted to alternative means of investment in other to minimize risk due to reasons such as fluctuation of interest rates, series of bank scams that led to distrust from the people in the banking sector. Investors were not certain of the genuineness of the transparency in the banking sector. A lot of investors were let down in the course of scam putting them at a great loss, thereby losing their trusts in the management of the banking sector. One major reason for investors search for alternative investments was the financial crisis in 2008.

For this reasons, mutual funds industry has a very important role to play in providing an avenue of alternative investment for a vast array of investors in a professional manner.

1.2 Definition of Mutual Funds

Mutual fund is a pool of money or investment brought together to invest in a portfolio of profitable ventures or to raise capital in other to invest in various companies. Mutual fund stocks are very liquid and are used in buying or selling shares which yield dividends that are distributed amongst shareholders. Dividends are received on the shares held and capital gains or loss are realised on the traded securities.

Navnit P. Kasundra (2012 p5) listed the processes of mutual fund investment as follows:

Steps of mutual fund investment:

1. Gather funds from various investors
2. Invest the fund according to investor's requirement making sure the fund's portfolio is properly diversified.
3. Earning from the fund are classified as dividend or asset appreciation.
4. Earnings are redeemable by investors at a specified time in close end funds and anytime in open end funds

.

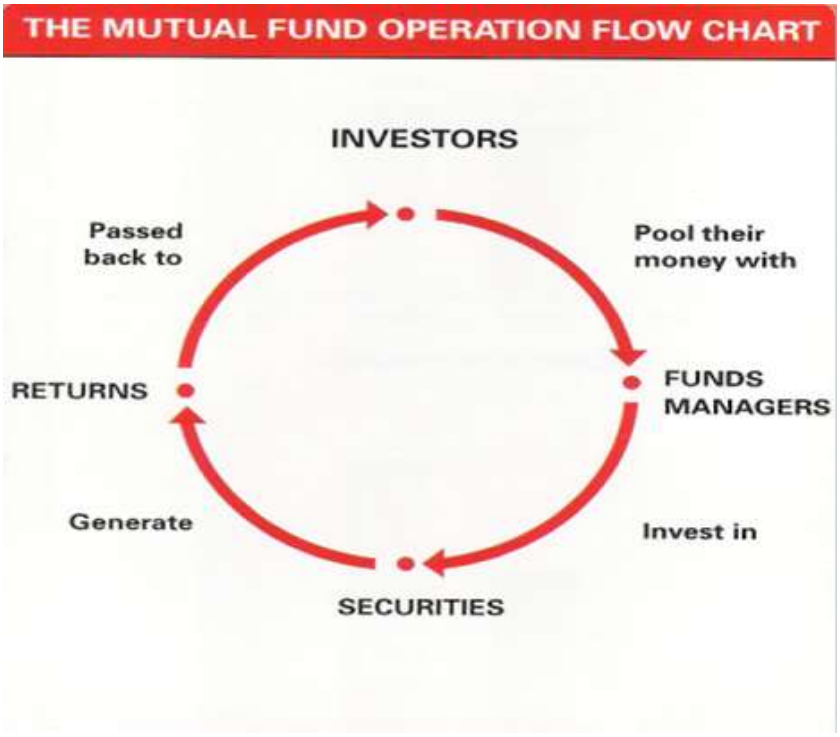

Figure 1.1: The mutual fund operation flow chart (Source: www.slideshare.net)

1.2.1 Mutual Fund Classification

Mutual funds are named according to their management pattern. There are majorly two types of funds, namely; open end funds and closed end funds.

Open end funds are funds that issue shares at their net asset value (NAV). It allows investors to cash out their funds by selling their shares back to the fund at the net asset value.

Closed end funds are funds whose shares are traded on organized exchange like every other common stock at a price different from the net asset value. It does not allow investors who cash out their funds to sell it back instead they sell to different investors.

Net Asset Value (NAV) is the value of shares owned by investors in investment companies. Mathematically, net asset value is explained as market value assets minus liabilities divided by shares outstanding.

Investment in mutual funds provide smaller venture the opportunity of partaking in the returns on big investment which they cannot afford to invest in on their own.

Mutual funds are operated by investment companies who are financial intermediaries that gather funds from individual investors to create a pool of assets and invest this fund in a range of securities that are expected to perform well. These funds are known as managed funds. These Mutual funds are classified according to their investment policy, that is they are identified by the sector or asset they are invested in such as money market funds; funds that invest in money market securities, equity funds, sector funds, bond funds, balanced funds, index funds to mention a few.

1.3 History of Mutual Fund

Funds investment has been ongoing and growing for over 20 years. In fact, the first investment of pooled asset was first mentioned s back as 1774 by a Dutch merchant named Adriaan van Ketwich. The first modern mutual fund went public in 1924 and the mutual fund industry has expanded since then; surviving the stock market crash of 1929 although some closed-end funds could not survive the crash.

Mutual funds got the attention of the public, especially investors in 1980's all through early 1990's when investment in mutual fund provided investors with an exceedingly high return due to its outperformance in the market.

Hence, Mutual funds have gone through various structural changes and it has been able to plant its feet firmly in the finance industry. Mutual funds are now a dominant investment pooling company. Statistics shows that the United States of America mutual fund industry manages assets of over $8 trillion as at 2005.Therefore, mutual funds are known to reduce risk of total loss, that is, it lessens the weight of an investment loss on investors through diversification.

Nevertheless, the risk involved in investment, that is both the systematic (undiversified risk) and unsystematic risk (diversified risk) cannot be ignored. Although, mutual funds are assumed to be risk free in its mode of management and investment as a result of diversification allowing investors the opportunity to invest in diverse market sectors.

One major advantage of mutual fund investment is that it serves as a source of capital outflow and in flow in the economy.
Investment in mutual funds provides an atmosphere for an investor to take on risks with the expectation of achieving higher returns even when investors are unable to actively manage their investments. Mutual Funds

also contribute vigor to the security markets where their investment is focused, as a result adding to the liquidity strength of the market and its price discovery. Instead of the locking up a substantial amount of money or assets in unproductive physical capital such as gold, the mutual funds serves as a significant factor in the channeling of money in the market.

Other Advantages of Mutual Funds

- Opportunity of Professional management
- Transparency of returns
- Diversification
- Ease of administration
- Tax benefits
- Organized regulation of the industry
- Source of capital flow in the economy; mutual funds increase the level of risk capital that is existing in the economy to fund enterprise.

Mutual funds also contribute to the liquidity and price discovery of the security market they are invested in, thereby, channeling more money into the market.

However, critiques of mutual funds have stated disadvantages of mutual funds. Some of mutual funds drawbacks are highlighted as follows;

- The cost of administration fee and commissions of mutual is too high and sometimes reduces the return when the cost incurred is deducted from the total return.
- There is no guarantee on the returns to be expected as a result of effects on systematic risks on investments.
- Fund managers decision; the expected return possible depends on the experts decision so there is risk if the fund manager is not efficient enough.

1.3.1 Mutual Fund Managers:

Mutual fund manager is an individual who is in charge of putting into practice the expertise of investment strategy in managing portfolio trading activities. A fund manager ensures the opportunity of diversification without the investors going through securities selection process. Fund managers

require a fee for the services carried out and this fee is a percentage of the fund's average assets under management.

Accordingly, an investor paying a fund manager to perform his duties on the investors fund will be concerned about the fund manager's efficiency in earning a profitable return. The investors will ask the following questions

- '' How effective could the use of fund manager be?''
- '' Can I as an ordinary investor invest and beat the market without the use of a fund manager?''
- ''Is it worth to invest in a fund manager''?

Hence, to answer and confirm above questions, this paper will draw a string from many researches that have been carried out on mutual funds performance over the years which have given birth to a variety of efficient portfolio risk management models/theories.
The theory used in this research is the Monte Carlo simulation model and the Mean Variance approach by Markowitz.

This paper will focus on efficiency of portfolio risk management in minimizing risk with focus on mutual fund, that is, providing a benchmark from which investors can make comparison that will guide in the portfolio decision making.

This dissertation will apply fundamental statistical analysis (Monte Carlo simulation) to analyze investment in the fund by getting data on top performing funds in the United Kingdom, United States of America, Germany, European funds, Nigerian funds, Emerging market funds and yearly data for five years on mutual funds from 2008 to –2012.

Therefore, I will apply the Monte Carlo simulation method to explain and appraise fund management with focus on the best possible fund portfolio that will yield optimum profit at low risk keeping in mind the effect of financial crisis on the correlation of asset.

In addition, this study will analyse above-mentioned mutual funds in terms of their risk and return and provide suggestions on the portfolio choice.

Chapter 2 Critical literature Review

2.1 Literature review

Application of portfolio risk management on mutual funds is a profound topic in the financial market. So far, research has been made involving mutual fund performance using different portfolio theories. The Modern Portfolio Theory also known as the mean variance approach formulated by Harry Markowitz was initially mentioned in the Journal of Finance published in 1952. The base of the theory was later established and expanded upon by William Sharpe, who propounded the Capital Asset Pricing Model (CAPM). These theories have been tested by different researches in Journals and articles.

Tze Leung et al. (2011) shed light on the mean variance approach as a single-period theory on the choice of portfolio weights that provide the best possible trade-off between the mean which represents profit and the variance that serves as a measure of risk for a potential portfolio return.

Recent study was carried out by Nargis, Hasinur Rahaman, Hasina and Khan and they were able to show the efficiency frontier as a combination of the portfolio with minimum risk and portfolio with maximum return.

However in their study, it was difficult to show exactly where the efficiency frontier is as a result of the number of assets involved.

2.1.1 Fund Performance

Fund performance has been classified into two forms by mutual fund authors as positive fund performance and negative fund performance.

Mukta, Sweta and Rahul (2012) explains that a relationship exists between past performance of fund and its future performance, that is when a mutual fund performs well in the past, it is likely it performs well in the future. This is known as the 'performance persistence of fund'.

Hence, they went ahead to explain that a mutual fund that has performed well in the past will continue to outperform in the future, this condition is called the positive persistence of the mutual fund. Likewise, negative persistence means that if a mutual fund has not performed well in the past then it will continue to underperform in the future as well.

Sharpe (1966) supported the persistence in the performance of the mutual funds. Chen, Jegadeesh and Wermers (2000) and Rao (2001), agrees to the existence of positive persistence of mutual fund but it is emphasize that it is possible only on the short run period.

However, Jan and Hung (2004) claimed that if there is mutual fund performance persistence in the short run, it should also occur in the long run. They proved their finding that if persistence occurs in a current year then it should persist into the following year and that process should continue on a rolling year basis. Their research confirmed that short run and long run performance of fund is very important in security selection of funds.

In contrast, another study done by Jan and Hung (2003) did not support the performance persistence in the mutual funds. Carhart (1997) detected an insignificant proof of skilled mutual fund managers regarding to persistence of the performance.

These authors focused on the performance of mutual funds in terms of factors affecting mutual fund returns. Meanwhile, the authors did not include studies on the need of fund managers in the managing mutual funds and the possibilities of outperforming the market in relation to these factors.

According to Wermers (2000 p. 35) stated '' results arrived at between the year 1975 and 1994 implies that indicate that mutual funds held in stock portfolios outperform the benchmarket market index by 1.3 percent per year''. This outperformance is due to the quality of stocks funds invest in and the talent of stock selection of the fund manager''

In addition, Wermers (1997) and Grinblatt et al (1993) also confirmed that fund managers who trade actively have significant stock selection skills'' For instance, funds who invest in stocks with higher average returns tend to outperform the passive stock market.

However, Wermers (2000 p. 36) contradicted above statement by stating that the net return of the funds underperform the market indexes by one percent. This is caused by the lower average returns of other securities in the fund portfolio that are not held in stock over the period investigated. He further explained the difference in the net-return fund performance and gross is the expense ratio of the transactions cost of funds. Furthermore, he stated that when the stock holding investment are solely measured, mutual fund managers tend to invest in stocks that outperform the market portfolio by an amount almost sufficient to pay up their expenses and cost of operations. This is in line with the Grossman and Stiglitz's equilibrium model (1980).

Stock Mutual Funds	Performance 1 Year	3 Year	5 Year
Large-Cap Funds	14.7%	9.0%	0.9%
Benchmark	16.0%	10.9%	1.7%
Mid-Cap Funds	14.5%	10.9%	2.4%
Benchmark	17.9%	13.6%	5.2%
Small-Cap Funds	14.6%	11.6%	3.0%
Benchmark	16.3%	14.1%	5.1%

(source: Standard & Poors)

Figure 2.1: Table showing the USA fund 1, 3 and 5 years active performance (Source: http://awealthofcommonsense.com/do-your-mutual-funds-outperform-the-market)

Hence, these studies shows that fund managers possess the capacity to outperform the market especially before the deduction of operation and/or commission fees are deducted.

Nevertheless, a number of studies carried outperformance of active fund performance concluded that mutual funds on average underperform the market index or benchmark. Partly, this may reflect the costly and unproductive efforts made by mutual funds to outperform the market volatile markets.

A study on mutual fund from 1985 to 1994 by Gruber (1996) had shown that the passive market index outperformed the average mutual funds by 65 basis points.

In addition, Carhart (1997) finds that ''the more active management of mutual fund is, the lower the fund's benchmark-adjusted net return to investors''. He also explained performance in terms of other factors that accrue to the performance of fund and the efficiency of the fund manager in terms of market timing and style analysis. Prior to Carharts' study, Jensens (1968) discovered that manager's market timing skills are not efficient in achieving the expected return, that is, they have been able to time the market well.

2.1.2 Mutual Fund Performance and Fund Managers Tenure

According to Lee and Rahman (1990) mutual fund managers are able to time the market well and achieve significant result through effective security analysis.

Consequently, studies on active and passive mutual fund performance have been carried out regarding the impact of mutual fund performance in terms of fund managers' tenure.

With the use of a different means, Mishelson and Wagner (1999) discovered that there is no evidence of any relationship between mutual fund manager tenure and its performance. According to this study, choosing a mutual fund with regards to manager tenure is not the best form of investment. As fund manager's tenure does not have any impact on its performance.

In a different study by Costa et al. (2006), it was concluded that manager tenure is not a significant factor when looking for superior mutual fund investment returns. They also concluded that a fund managers experience with fund is not a factor to be considered in the achieving a well adjusted risk-return trade off in investment. This can be attributed to the market volatility.

2.2 Mutual fund and Risk

Mutual funds are not in total risk free as it is exposed to both systematic and unsystematic risks. Different funds are exposed to varying level of risks and fund managers attempt to minimize the risk.

In an earlier study, Kim (1978) studied mutual fund data from 1969 to 1975 and realised that most of the funds were outperformed by it benchmark portfolio emphasizing the investment experience of the analyzed period is consistent with the efficient market hypothesis, as many previous studies of mutual funds were.

The study went further to compare returns on mutual fund with high risk and their benchmark portfolio concluding that the gap between the returns on the mutual funds of high risk and their benchmark portfolios is likely to reduce if the mutual fund is compared to a more risky market index.

2.2.1 Mutual Fund Risk

Risk can be defined as a likelihood of loss either in a total or a virtual term. Oxford dictionary of finance and banking (2008 p.386) explains that

risk cannot be separated from financial gains, that is, research on investment risk is as important as the research on its return.

In other words, risk is the likelihood that an investment may not perform as well as expected or it may reduce in its value unexpectedly. As mentioned earlier, no investment is risk free irrespective of its location or allocation. For example, money kept securely in the bank in a savings account is exposed to inflation risk.

2.2.2 Types of Mutual fund risk

1. Credit Risk: This is also known as default risk. It is the likelihood or possibility that the company the funds are invested in will not pay dividend due or the principal amount after maturity of the contract. Investors can avoid this by carrying out a thorough research on the creditworthiness of the firm.
2. Inflation risk: This is the risk that money held today will worth less than it's worth today. It is the risk that the dollar gotten when sold will buy less than the dollar originally invested.
3. Interest rate risk: This is the risk of a sudden increase in interest rates.
4. Market Risk: This is the risk that the value of investment will decrease.

In a very recent study by Navnit P. Kasundra (2012 p.21), Navnit laid more emphasis on risk return trade off in mutual fund performance by analysing different types of risk involved in investment in fund. He stated that Mutual Funds do not guarantee expected returns and these returns are an indicator of the fund performance.

Mutual funds are invested into various risky assets. The value of the fund will depend on the performance of the organization/security they are invested and the likelihood of this organization to default in payment of dividend, interest and or principal is called credit risk.
Apart from the above, risk could come from new regulations from the government which may adverse effect on a particular class of industry. All these are issues influencing Mutual Funds performance.

2.3 Mutual Fund Risk Ranking

Navnit P. Kasundra (2012 p.21) in his study classified different types of mutual fund and ranked them with the level of risk possible. He expressed this in form of a graph.

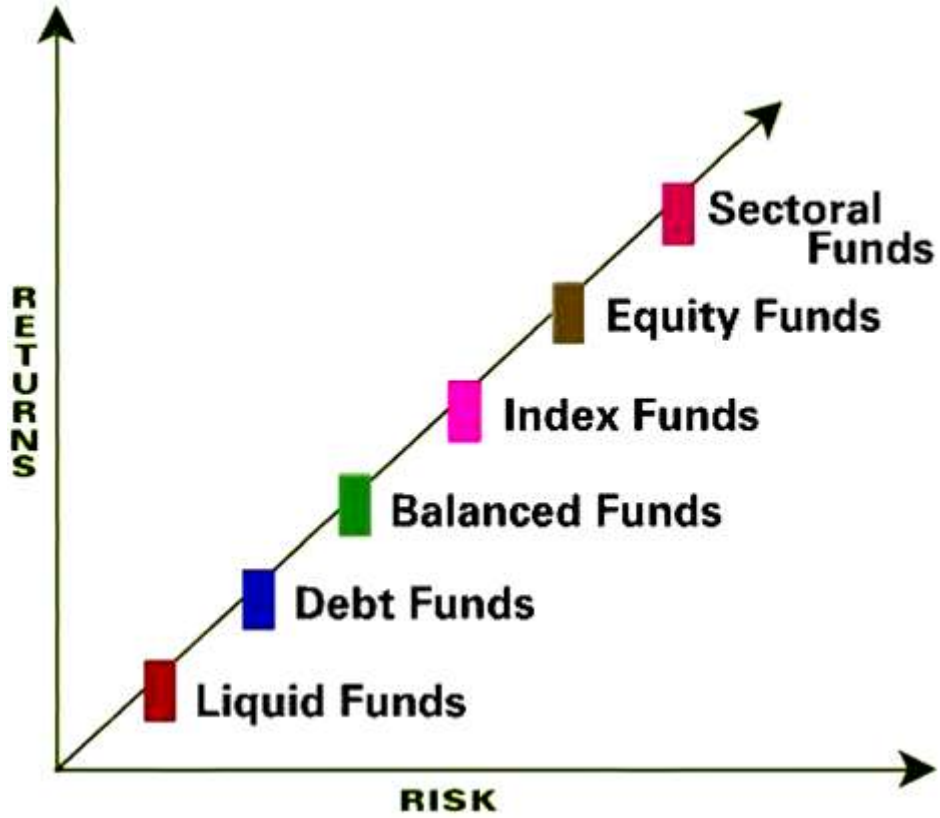

Figure 2.2: Types of funds ranking (Source: *Navnit P. Kasundra, performance evaluation of mutual fund (2012))*

The above graph shows that liquid funds are less risky than debt funds and other types of fund because of its early maturity. The property of a mutual fund as a short term investment reduces the effect of market volatility in its return. In ascending order debt funds are exposed to a lesser risk than balanced fund likewise index funds are less risky than equity fund. As a result sectoral risk is the most risky mutual fund.

One fundamental rule applies to all investments. The lesser the risk accrued to an investment or a fund, the smaller the expected return. The more the risk accrued to an investment or a fund, the higher the expected return. An investor's objective determines the degree of risk an investor is ready to talk on.

An investment with a longer time to maturity tends to take on more risk as the business cycle or fluctuations in the market tend to even out over time. For example the effect of the financial crisis on the global economy that started in 2008 is reducing as policy makers are making decisions

everyday to return the health of the nation to its peak. Despite the irregularities in the stock market, it has risen in the last few years.

2.4 Types of Mutual Funds

Bodie et al(2011 p. 124-126) classified mutual funds into eight(8) types of funds namely; money market fund, balanced funds, equity funds, sector funds, international funds, bond funds, asset allocation and flexible funds and index fund.

Navnit P. Kasundra (2012 p.21) also characterised fund in terms of its objectives and scheme. Mutual funds Scheme are open ended funds and close end funds.

Mutual fund in terms of its objectives

(a)Liquid fund/ Money Market funds

Liquid funds are short term funds with a maturity that is less than a year, ranging from three (3) months to a year. It gives investors the opportunity to claim their funds whenever the needs arise without penalty. It is advantaged because it allows the investors the opportunities of earning a return on their investment without holding the asset for a long time. Money Market funds are short term funds such as commercial paper, certificates of deposits and repurchase agreement. Money market funds usually offer check-writing features and net asset values is fixed at $1 per share. Furthermore, it reduces the investor's exposure to inflation risk among others. They are used in place of short term fix deposits.

(b)Equity funds are funds that invest majorly in stock. It might also be invested in fixed- income or other types of securities at the fund maagers choice. In other to provide liquidity equity funds holds up to 5% of its total assets in the money market. Their main objective is to make available capital appreciation over the medium and long term period of investment. Equity funds are sometimes known as growth funds. The returns in this type of funds are volatile because the fund is directly linked to the stock market.

Navnit P. Kasundra (2012 p.21) categorized the types of equity funds as, Sector specific funds, diversified funds and Index based funds

(i) Sector funds: They are types of equity fund that focuses on a particular type of industry. They are also known as thematic funds. This fund are concentrated on specific industry such as

biotechnology, utilities, precious metals or telecommunications, that is, their investment are restricted to a specific segment or sector in the economy.

Sector funds tend to be more volatile than other funds that are more diversified in investing in many industries. Such diversified portfolios possess higher probabilities of producing remarkable gains or losses, depending on whether the chosen sector is in or out of favour. Sector mutual funds provide a risk-return reward and are not attractive to risk averse investors.

By and large, mutual fund institutes evade beginning with sector funds because they are nomadic in nature and perform well only in phases/cycles. Hence the sector funds focus on a single sector of the economy, thereby limiting diversification and the fund manager's ability to capitalise on other sectors, if the specific sectors aren't doing well. Unless a particular sector is doing very well and it has a potential long term growth, it advisable not to trade in sector funds.

(ii) Index funds are types of equity funds that attempt to match the performance of the broad market index. Index fund are planned to equal the expected returns on a stock market index. They can also be defined as mutual funds whose portfolio and performance is equivalent to the portfolio of a broad market index, for example, the Dow Jones index. Indexing is a passive form of fund management that is a base of argument and research by many authors. The argument is that the index funds outperform most actively managed funds. The major advantage of indexing is the opportunity of a lesser operational cost. Many actively managed mutual funds do not outperform the market indexes because of the reduction in returns by higher expense ratios.

(a) Bond funds: this funds specializes in the fixed- income sector. However, there is considerable room for further specialization. It is a mutual fund that lays emphasis on income in relation to risk rather than growth. Bond funds are invested in corporate, municipal, or US government debt obligations, or some combination of them. Gains are shared in terms of dividends calculated from coupon payments and principal at the maturity of the bonds. A bond mutual fund tends to yield more dividends more often than an individual bond. Bond mutual funds are composed of either each of convertible, treasury, mortgage or municipal bonds or a portfolio of these bonds.

(b) International Funds: These are funds with an international focus. This fund is classified into global fund, Regional funds and emerging

market funds. From a United State perspective, International funds are funds that invest in companies or securities international to the United States. Global funds invest in securities worldwide including the country which the fund is domicile. Regional funds are focused on a particular part of the world. Finally, emerging market funds are funds that invest in securities of developing countries.

(c) Balanced Funds: These funds exhibit both the characteristics of both equity funds and bond funds. They invest in equity shares as well as fixed-income instruments in different or same proportion. Balanced fund reduces the volatility of the fund and it provides a steady return for investors. This type of fund is usually recommended to investors with a moderate level of risk tolerance for medium to long term period.

(d) Asset allocation funds and flexible funds are similar to balanced funds in that they are both invested in stocks as in equity funds and bond as in bond funds. It also reduces volatility of funds in the market. Their weights of allocation vary in proportion relative to the portfolio manager or fund manager decisions.

2.5 Effect of Risk Shifting on Mutual Fund Performance

Jennifer Huang et al (2011) went further in the analysis of mutual fund by examining the effect of risk shifting on the performance of mutual funds. He explained that mutual fund changes its risk overtime and this can be as a result of unguided trade of unskilled fund managers who only trade for their own individual gain. On the contrary, risk shifting can also occur when fund managers make use of all opportunities of their stock selection abilities in investment.

Furthermore, this study investigates the cost of risk shifting on mutual fund performance and the economic incentive associated with risk-shifting behaviour. They used a holding-based gauge of risk shifting and concluded that funds with stable risk perform better than funds that increases risk exposure. This result suggests that risk shifting indicates the inferior ability of the fund manager.

In addition, it could also be inferred that risk shifting is one of the factors to be considered in mutual fund performance appraisal.

Besides risk shifting; the performances of Mutual funds are subjective to activities and the state of the stock market and the economic conditions in its totality.

Moreover, the stock market is in itself subject to the company performance and the economy as a whole. The performance of the sector funds is largely dependent on the performance of the industries that sector.

Equity Funds are largely affected by the stock market. Bond-funds are subject to changes in interest rates and credit quality. A rise in the interest rates will cause the price of bond to fall and when interest rate falls, bond price increases. In the same vein, changes in the economy do not have great influence on bonds with high credit ratings.

2.6 Other factors that influence the Performance of a Mutual Fund

1. **Manager's** Tenure: Managers tenure is the number of years a particular fund manager handles a particular fund. Whenever a well performing fund is discovered, attention will be drawn to the fund manager who is responsible for the impressive returns.
   Demissew and Raja (2009, p103-112) studied the effect of managerial tenure on the performance of mutual funds. They examined the diverse aspects of the mutual funds and relate its performance to their fund manager's tenure. Finally, they concluded that managerial tenure has a positive impact on mutual fund performance. Manager's tenure has a statistically significant effect on the three to five years annualized returns and positive statistically insignificant on the 10 year returns. This is because long-term performance will reflect no significant information about future performance if the manager has only been managing the fund for one year. Manager tenure is especially important when analyzing actively-managed funds.

2. Expense Ratio: This is the cost incurred in the management of fund and it has an on impact on the fund performance. The expense ratio accumulates daily. Their relationship shows an indirect proportionality. Therefore over a long period of time such as 10years, the funds with the lowest expense ratios are frequently those with the best performance. It represents the percentage of cost incurred in an investment each fiscal year. It comprises of all the cost incurred by the fund, this costs include the management fees, administrative fees and the operating costs. Portfolio transaction fees and sales charges are not included in the expense ratio. Whenever there are small fund's assets, the expense ratio tends to be high.
   On the other hand, the growth of a fund's net asset value is accompanied by a smaller percentage of expense ratios as charges are allocated over a wider base. Some funds might decide not to claim all or a fraction of the expenses that is composite of the overall expense ratio.

3. Turnover Ratio: A fund's turnover is a percentage measurement of a mutual fund holding that has been turned over in a given year. The

turnover ratio is determined by the type of mutual fund, objective of the mutual fund and the investment style of a fund manager. A high turnover ratio indicates frequent trading, which can drive expenses and relative risk higher. For example, a stock index fund will be characterised by a small turnover rate, but a bond fund, either on a passive or an active management, will possess a high turnover because bond investments are characterized by active trading. Furthermore, a large- cap value stock fund tends to have a lower turnover ratio when compared to an aggressive small-cap growth stock.

Ceteris Paribus, investors should favour funds with low turnover. High turnover results in higher transaction fees, which on a net return basis would reduce the return on fund. Turnover ratios for a mutual fund will be different from year to year, but the universal range can be measured by studying the values over a considerable number of years.

4. Tax Cost: If you have investment assets in a taxable account, you'll want to be careful not to place too many funds that generate taxes, such as dividend mutual funds, in the account. Investors are bound to pay on any gains they realize on an investment. Consequently, over the course of a year, investors must include the capital gain realized/ achieved in the filing of income tax. For this reason, it is very important for a fund manager to be able to accurately calculate the likely cost basis that might be incurred on an investment and especially a mutual fund investment.

   The actual worth of an asset adjusted for stock splits, dividends and capital distributions is referred to as the cost basis. The cost basis is extremely significant for the calculation of tax from the capital gain. The calculation of cost basis becomes rather complicated in the case of mutual fund as a result of dividend payment and the reinvested of capital gain.

You may also consider using some of the best index funds, which naturally have low expenses, low turnover and good tax efficiency.

From above stated studies, evidence do not pose an encouraging picture of mutual funds, rather, the studies conclude that it is better to invest directly in the stock market. Despite all this research investors still continue to invest heavily into actively managed funds in other to achieve optimum or desired performance.

Many other researchers have been done in portfolio management using some or all these theories and it has been concluded that they do not work in the real market.

Nevertheless, the argument in the literatures is how effective the use of portfolio management theories/models such as optimization of risky asset using the mean-variance method and Monte Carlo simulation theory is in the practicable (real life situations) system of portfolio risk management.

Chapter 3 Theoretical Orientation and Research

Methodology

Mutual fund existence and importance in the last few decades has caused investors, stock analysts and fund managers to seek dependable means of achieving their stipulated future risk and return of a portfolio of securities. The researches were carried out having in mind that;

- All investment are prone to risk
- It is possible to apply statistical analysis on historical data
- Due to variability and volatility, it is possible to maximize return and minimize risk.

Therefore, the above mentioned assumptions illustrate the Modern Portfolio Theory (Mean Variance Approach) by Harry Markowitz mentioned in 1952 in the *Journal of Finance*. William Sharpe the founder of the Capital Asset Pricing Model expanded on the foundation theories of Mean Variance Model.

3.1 Model Specification

3.1.1 Mean Variance Model

According to Myles E. (2013, p.60), Markowitz assumed that:

- Investors are rational.
- Investors are willing to take on higher risks only if they a higher expected return is certain.
- information concerning investment decision are gathered by investors; an investor would want to have a clue on the potential return the investment would yield and at the level of risk
- The theory also assumed that there is a chance of a risk free asset, that is, government Treasury bill.
- Preferences are given to the risk - return trade off, that is, at a given level of expected return, an investor would prefer a lower risk and at a given level of risk, an investor would require a higher level of return.
- It is assumed that investment occur in a perfect capital market with no transaction costs.

In this context, Hasina and Khan (p.51 2013) applied the Mean variance approach and CAPM on stock market data specifically Vodafone, Barclays and

Next, thereby creating the best/optimum portfolio. The goal of the research is to create a benchmark portfolio to compare with stocks current price, with the aim of figuring out what stock to invest in.

The mean-variance approach makes use of risk and expected return trade off as indicators in analyzing investment performance. Hillier et al. (2008, p.243) stated the measures of risk as variance and standard deviation.

A. The portfolio's expected return is calculated by using the formula:

$$R_P = \sum_{x=1}^{n} W_x \, \mathbf{x} \, \bar{\mathbf{R}}_x$$ Where:

$\bar{\mathbf{R}}_x$ depicts the return of company

W_x depicts the weight allocated to the company

R_P represents the potential return on portfolio

N represents the number of companies in the portfolio

B. Portfolio's standard deviation is calculated by using the formula:

$$\sigma_p = \sqrt{\sum_{x=1}^{N} \sum_{y=1}^{N} W_x * W_y * Cov(x,y)}$$ Where:

σ_p = Portfolio's standard deviation

W_x represents the company weight for company x

W_y represents the company weight for company y

Cov(x, y) represents the covariance of company x and y

N represents the number of companies in the portfolio

Hillier et al. (2008, p.256) also described standard deviation and variance as an indicator of volatility of a security's return, describing standard deviation as the square root of variance. In addition, he emphasized the importance of diversification in investment management.

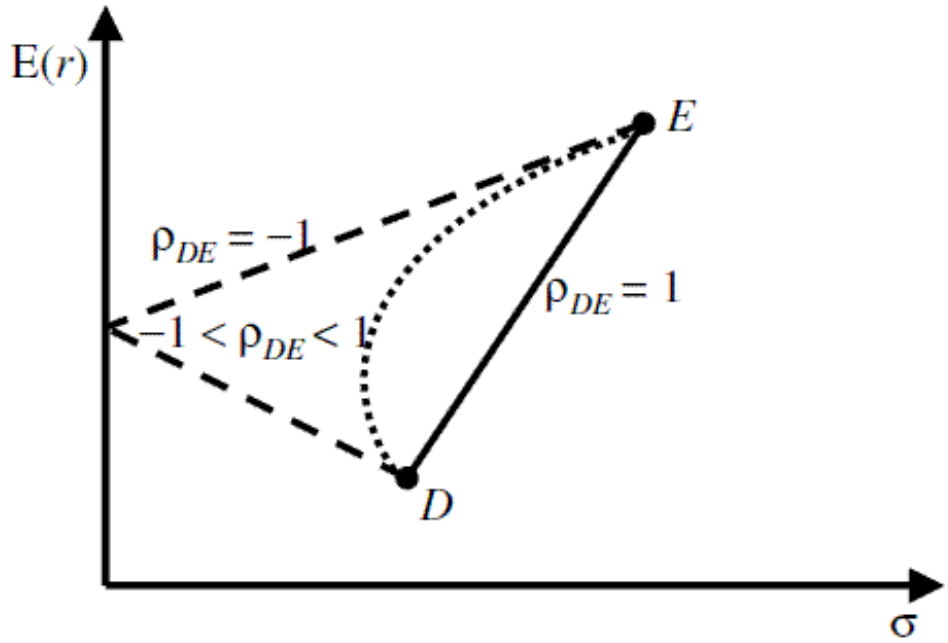

Figure 0.1: Graph showing correlation of two assets (Source: Group coursework Report 2012 FNM 120).

The graph on Figure 3.1 shows the correlation of two assets and the result of diversification.

$$\rho_{AB} = \frac{CovarianceAB}{Standard\ deviation\ A * Standard\ deviation\ B}$$

$$-1 \leq \rho_{AB} \leq 1$$

-1 represents perfect negative correlation

1 represents perfect positively correlation

0 represents no correlation

Markowitz argues that investing in different types of assets that are not perfectly positively correlated can minimize portfolio risk that is, investors can minimize excess risk that is likely to occur from holding an individual asset by making a choice of investing in a diversified asset.

Fabozzi et al. (2002) explained diversification by relating it to a common adage that says 'we should not put all our eggs in one basket'. Meaning that it is likely an investor incurs a total risk if the basket falls, Diversification can

therefore be explained as investing in various assets with different kinds of risk.

However, recent studies, have extensively criticized these assumptions. Some of the criticisms accrued to this model include:

First, the assumption of market efficiency was challenged by studies and real life occurrence of market bubbles, boom and the recent financial crisis. The criticism and events in the market has been able to prove the inefficiency of the market.

Second, fund managers and investors possess different degree of information. This is called information asymmetry. The form of access to information is contrary to the assumption of perfect information by Markowitz. The sources and degree of information affects mangers decisions on investment.

Third, the assumption of a perfect capital market with no taxes and transaction cost has been criticized based on the argument that mutual fund investment is subject to tax, operational cost and commission fees.

Finally, the major assumption of investor's rationality, that is, the assumption that investors usually seek out to maximize return and minimize risk has been criticised based on the argument that, investors prefer to invest in popular sector and the market in boom because of speculated excess return (Myles, 2013, p.67).

3.1.2 Monte Carlo Simulation Technique

In the light of above stated criticism, this research will use the Monte simulation technique in other to have an in-depth research.

The Monte Carlo technique was introduced during the World War II by a scientist working on the atomic bomb. Since its existence, it has been used tremendously in the field of finance and other science fields. David B. Hertz originally introduced the Monte Carlo methods to finance in 1964 by in an article written in the Harvard Business Review.

Further in 1977, Phelim Boyle pioneered the use of Monte Carlo simulation was pioneered in options valuations. In the face of uncertainty, ambiguity and volatility in the market, Monte Carlo simulation method provides a total view of all possible outcomes of investment decisions.

Furthermore, Monte Carlo simulation method is a mathematical process that allows the decision maker, investor or fund manager in this case a series of possible outcome and probabilities of occurrence for any investment decision. Monte Carlo simulation techniques allows for random selection of a series of data in creating a portfolio of investment. Monte Carlo simulation technique is popular in other professional fields apart from finance such as engineering, project management, energy, oil industry, research and development, transportation and insurance.

Therefore, Monte Carlo technique advantage over other techniques becomes more significant as the sources of uncertainty, volatility and ambiguity in the market increases.

3.1.2.1 Steps to Monte Carlo simulation

1. Specify the model

   The author selected mutual fund data on the last price, 12 months dividend per share and the total return index gross dividend which is used for the total return of the period given. The model estimates the probability of choosing a company and earning an expected return that will outperform the market provided equal weights are given to each asset in the portfolio.

2. Simulate a draw from the data and estimate the model using the simulated data.

   The author selects 10 assets, 8 assets and 4 assets each at different interval of simulation from sample funds from each regions from which the mutual fund is domicile.

3. The author repeated the step three times each for each sample region of study and saved the result for each simulation

4. I stored the data in tabular forms and histogram for better analysis

3.1.3 Brief Overview of Mutual Fund Performance Worldwide

Active mutual funds are represented in different categories as people invest every sector of mutual funds across a range of markets, either geographically, by sector or in terms of investment style. According to statistics gathered by the Investment Company Institute on mutual fund, the number of mutual funds globally increased from 564 in 1980 t0 7,600 in 2011.

At the end of the first quarter of 2013, mutual fund assets have increased by 3.8 percent globally to $27.86 trillion. The net cash flow worldwide to all funds increased to $339 billion in the first quarter of 2013 when weighed against to the net cash flow at the end of 2012 which was $427 billion. Long-term funds rose to $447 billion early 2013 which is recorded has the highest so far in the history of long term funds. Equity funds had the largest net inflow globally, calculated to be $144 billion in early 2013 which happens to be the highest since 2006.

The bond fund went down from $217 billion to $189 billion in the first quarter of 2013. The bond fund did not perform well when compared to other funds in the market. The money market funds also did not perform well as it dropped from $137 billion in 2012 to $109 billion in the first quarter of 2013.

The table below shows the performance of funds worldwide.

Table 0.1: National mutual funds (Source: National mutual fund associations)

TOTAL NET ASSETS IN U.S. DOLLARS
Millions, end of period

COUNTRY	2008	2009	2010	2011	2012			
					Q1	Q2	Q3	Q4
World	**18,920,057**	**22,945,623**	**24,710,398**	**23,796,672**	**25,596,418**	**24,768,814**	**26,045,253**	**26,837,407**
Americas	**10,581,988**	**12,578,593**	**13,598,071**	**13,530,122**	**14,544,844**	**14,152,318**	**14,808,325**	**15,139,998**
Argentina	3,867	4,470	5,179	6,808	8,316	8,702	8,571	9,185
Brazil	479,321	783,970	980,448	1,008,928	1,110,912	1,023,961	1,052,036	1,070,998
Canada	416,031	565,156	636,947	753,606	814,088	784,872	840,889	856,504
Chile	17,587	34,227	38,243	33,425	36,337	36,520	35,040	37,900
Costa Rica	1,098	1,309	1,470	1,266	1,511	1,571	1,651	1,484
Mexico	60,435	70,659	98,094	92,743	103,123	104,746	109,480	112,201
Trinidad& Tobago		5,832	5,812	5,989	6,079	6,152	6,388	6,505
United States	9,603,649	11,112,970	11,831,878	11,627,357	12,464,478	12,185,794	12,754,270	13,045,221
Europe	**6,231,116**	**7,545,535**	**7,903,389**	**7,220,298**	**7,885,878**	**7,420,122**	**7,902,218**	**8,230,061**
Austria	93,269	99,628	94,670	81,038	85,713	80,011	85,288	89,125
Belgium	105,057	106,721	96,288	81,505	86,236	78,217	82,499	81,651
Bulgaria	226	256	302	291	289	267	296	324
Czech Republic	5,260	5,436	5,508	4,445	4,791	4,284	4,657	5,001
Denmark	65,182	83,024	89,800	84,891	93,702	90,798	98,525	103,506
Finland	48,750	66,131	71,210	62,193	69,024	64,763	70,483	73,985
France	1,591,082	1,805,641	1,617,176	1,382,068	1,512,396	1,394,348	1,439,987	1,473,085
Germany	237,986	317,543	333,713	293,011	318,856	290,567	314,040	327,640
Greece	12,189	12,434	8,627	5,213	5,246	4,487	5,001	6,011
Hungary	9,188	11,052	11,532	7,193	7,674	7,435	8,082	8,570
Ireland	720,486	860,515	1,014,104	1,061,051	1,162,938	1,136,830	1,216,670	1,276,601
Italy	263,588	279,474	234,313	180,754	187,276	167,755	176,227	181,720
Liechtenstein	20,489	30,329	35,387	32,606	32,116	32,968	32,459	31,951

Luxembourg	1,860,763	2,293,973	2,512,874	2,277,465	2,489,170	2,343,636	2,510,001	2,641,964
Malta				2,132	2,335	2,905	3,002	3,033
Netherlands	77,379	95,512	85,924	69,156	73,564	66,819	70,634	76,145
Norway	41,157	71,170	84,505	79,999	90,151	84,077	93,890	98,723
Poland	17,782	23,025	25,595	18,463	22,138	20,193	22,554	25,883
Portugal	13,572	15,808	11,004	7,321	7,547	6,598	6,987	7,509
Romania	326	1,134	1,713	2,388	2,244	2,251	2,400	2,613
Russia	2,026	3,182	3,917	3,072	3,508	2,877		
Slovakia	3,841	4,222	4,349	3,191	3,076	2,803	2,882	2,952
Slovenia	2,067	2,610	2,663	2,279	2,474	2,226	2,340	2,370
Spain	270,983	269,611	216,915	195,220	204,754	183,537	188,660	191,284
Sweden	113,331	170,277	205,449	179,707	198,752	182,366	199,454	205,733
Switzerland	135,052	168,260	261,893	273,061	301,256	294,112	310,504	310,686
Turkey	15,404	19,426	19,545	14,048	14,820	14,993	15,862	16,478
United Kingdom	504,681	729,141	854,413	816,537	903,832	857,999	938,834	985,517
Asia and Pacific	**2,037,536**	**2,715,234**	**3,067,323**	**2,921,276**	**3,030,867**	**3,067,208**	**3,196,427**	**3,322,198**
Australia	841,133	1,198,838	1,455,850	1,440,128	1,526,808	1,535,778	1,610,190	1,667,128
China	276,303	381,207	364,985	339,037	336,108	371,150	373,519	437,449
India	62,805	130,284	111,421	87,519	84,044	97,841	110,021	114,489
Japan	575,327	660,666	785,504	745,383	750,512	731,386	753,552	738,488
Korea, Rep. of	221,992	264,573	266,495	226,716	243,157	240,881	255,419	267,582
New Zealand	10,612	17,657	19,562	23,709	26,846	27,085	30,020	31,145
Pakistan	1,985	2,224	2,290	2,984	3,419	3,764	3,214	3,159
Philippines	1,263	1,488	2,184	2,363	2,737	2,956	3,210	3,566
Taiwan	46,116	58,297	59,032	53,437	57,236	56,367	57,282	59,192
Africa	**69,417**	**106,261**	**141,615**	**124,976**	**134,829**	**129,166**	**138,283**	**145,150**
South Africa	69,417	106,261	141,615	124,976	134,829	129,166	138,283	145,150

As a result of this vast increase in the number of funds worldwide, the decision making by investors have become difficult, therefore the need of a fund manager. In contrast, some investors believe that the increase in the numbers of mutual fund is an open door to more effective diversification advantages.

However, the likelihood of selecting the most excellent active mutual funds is low since most of these funds could not outperform the market over a period of time. Statistics for active mutual fund performance in the U.S stock mutual funds shows that above 60% of large-cap funds, 67% of small-cap funds and above 70% of mid-cap funds have been unable to beat failed to outperform the broad market index 2012.

According to Standard & Poor's report in 2012, the review of mutual funds in the U.S were not impressing for the year period ending in 2012 as the large, mid and small-cap active mutual funds underperformed for the five year period.

However, these reports only cover for the United State of America and not other countries in the world.

3.2 Methodology

Most researches carried out on active mutual fund performance have not included the use of Monte Carlo simulation technique in achieving their objectives neither have they compared mutual fund performance of different countries worldwide. The author wishes to evaluate the performances of mutual funds and compare to the selected index as benchmarks by reviewing broad studies that cover the vital issues of the research topic.

With an aim of researching beyond the usual jurisdiction, the author focuses on the Developed market, Frontier market, Emerging market and some other selected countries, laying emphasis on funds domicile in the United Kingdom, United States of America mutual as developed market, European fund market, Germany funds and emerging market funds and Nigeria as the Frontier Market. Nigeria could also be classified as an Emerging Market.

The research material has been acquired by reviewing existing literature and collection of secondary data.

3.2.1 Data Collection

Secondary Data Collection:

Secondary data was collected using the Bloomberg terminal to create a quantitative analysis. In addition, reports from articles, journals, previous research topics relating to the research focus were consulted.

The data collected were of top performing mutual funds using the Bloomberg fund ranking by location.

The author collected twelve (12) mutual fund data from United Kingdom, ten (10) each from United States of America, Germany, Europe (European funds), emerging market and five(5) in Nigeria as a result of limitation in the availability of data in Nigeria. Data from the United States of America, emerging markets were obtained in dollars. Other countries data were collected in their home currencies. All the data collected can be found in appendix 7.

The data collected of mutual fund were majorly from equity funds because it encompasses a greater percentage of worldwide mutual funds.

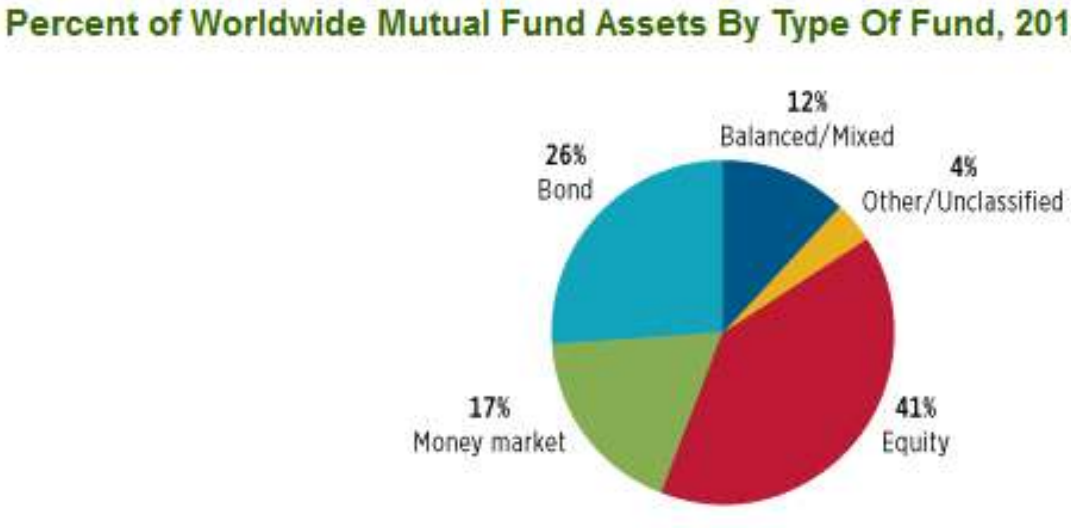

Figure 0.2: Percentage of world mutual fund assets (*Source: Worldwide Mutual Fund Assets And Flows First Quarter 2013 Report from Investment Company Institute)*

According to the chart on Figure 3.2, almost 40 percent of mutual fund assets worldwide were held in equity funds at the end of the first quarter of 2013. 26 percent of the asset share is allocated to the bond funds and 12 percent of the asset share is allocated to balanced/mixed funds was 12 percent. Money market fund assets are represented by 17 percent of the worldwide total.

In addition, data on relative index were also gathered in order to create the benchmark to which the portfolio of fund s will be compared. The stock market data were gathered of FTSE100, S&P 500, MSCI Emerging market index.

However, adjustment was made in the data collection according to ranking in that some of the funds that were pioneered within the last five years were not included in the data despite their ranking because yearly data was acquired from 2008 to 2012.

Therefore, data on yearly Total return index gross dividend was collected and average return of each mutual fund was calculated using the following formula:

Return on portfolio = (Ve – Vb)/Vb

Or

(Ve/Vb) - 1

Where Ve= Ending value of return

Vb = Beginning value of return

The objective of this data was

- To make a quantitative application of Monte Carlo simulation techniques on mutual fund
- To create a well structured portfolio from selected mutual funds
- To analyse risk-return of such portfolios and compare with market index
- To emphasize the importance of diversification in investment management
- To ensure optimum funds utilization.
- To determine the effectiveness of fund managers in investors return both in the short term and the long term.
- To determine how realistic the portfolio risk management theory, that is Monte Carlo simulation method is in mutual fund investment.

By using an array of data and carrying out a thorough analysis on obtained data with the combination of different methods and reviewed literature, the author believes this will eliminate any weakness of the research.

Chapter 4 : Result and Analysis

This analysis has been carried out to test the following hypothesis

- It is possible for a fund manager to outperform the market.
- It is better to invest in the stock market than investing in the mutual fund.
- It is more risky to invest in the market than in mutual funds.
- The diversification effect is more effective in the mutual fund than in the stock market.
- It is not worth it to invest through a fund manager.
- Diversification improves the performance of funds of funds.

4.1 Data

The author collected data on UK funds, USA funds, Germany funds, European funds, Nigerian funds and emerging market funds.

4.1.1 Summary of All Funds

United Kingdom

According to Bloomberg ranking, I collected data on the following funds:

- Oxford Technology Venture Capital Trust PLC (OXT: LN EQUITY),
- Perpetual Income and Growth Investment Trust PLC (PLIS: LN EQUITY), TP70 VCT PLC (TPV: LN),
- Henderson Opportunities Trust PLC (HOTS: LN),
- Legg Mason Funds ICVC - Japan Equity Fund (LMJEBAA: LN),
- Legg Mason Funds ICVC-Japan Equity Fund (LMJEQAA: LN),
- Baillie Gifford Japan Trust PLC (BGFD: LN),
- JPMorgan Income & Growth Investment PLC (JIGC: LN),
- Scottish Equitable Baillie Gifford Japan Pension (SCEBGJP: LN),
- Skandia INVESCO Japanese Small Cos Pension (SKIJSCP: LN),
- INVESCO PERPETUAL Small Co and Market Investment Series - Japanese Small Co Fund (INVJSCA: LN) and
- Baillie Gifford Shin Nippon PLC (BGS: LN)

Oxford Technology Venture Capital Trust PLC has the highest average return over the years of study with a return of 58% while Baillie Gifford Shin Nippon PLC (BGS: LN) has the least return in the portfolio with an approximate negative return of -2.19.

Table 4.1: Table showing the total return on United Kingdom Mutual fund investment (Source: Authors compilation).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		1	2	3	4	5	6	7	8	9	10	11	12	
2		OXT LN Eq	PLIS LN Eq	TPV LN Eq	HOTS LN E	BGFD LN E	LMJEBAA I	LMJEQAA	SCEBGJP L	SKIJSCP LN	JIGC LN Eq	INVJSCA L	BGS LN Equity	
3	Starting from 1	1	1	1	1	1	1	1	1	1	1	1	1	
4	2009	0.225	-0.16154	-0.05882	-0.47619	0.052265	-0.10983	-0.11648	0.044143	-0.00077	-0.36863	-0.01423	0.241935	
5	2010	0.851853	0.522936	-0.3125	-0.43091	0.312914	0.206753	0.198663	0.312074	0.059628	0.124224	0.085965	0.385281	
6	2011	-0.58	-0.20482	0.036364	-0.51757	-0.04666	0.279793	0.270683	-0.06674	-0.08063	-0.52486	-0.07184	0.004688	
7	2012	5.619031	0.810606	0.284405	0.721854	0.109788	0.093792	0.086341	0.109493	-0.08029	0.523256	-0.08778	0.241058	
8	(1+x)	1.584699	1.164431	0.963362	0.705417	1.099544	1.107366	1.099587	1.091344	0.972724	0.846609	0.975728	1.210222	
9	average return	0.584699	0.164431	-0.03664	-0.29458	0.099544	0.107366	0.099587	0.091344	-0.02728	-0.15339	-0.02427	0.210222	
10														

.

Brief overview of Oxford Technology Venture Capital Trust PLC (OXT: LN EQUITY)

Oxford Technology Venture Capital Trust plc is a closed-end equity fund domicile in the United Kingdom. The fund aims to create a portfolio composed of eligible securities towards achieving the potential return. Usually 70% of the fund's investment is directed towards the early stage companies and the rest of investment is directed towards start-up companies according to opportunities available

- Fund Type: Investment Trust
- Inception Date: 03/03/1997
- Objective: Foreign Growth
- Asset Class: Equity
- Geographic Focus: Global
- Net Asset Value as at 31/12/2008 : 43,0000

Performance Summary of Oxford Technology Venture Capital Trust Plc
Performance

Table 4.2: Table showing the summary of oxford technology venture capital trust Plc performance (Source: Bloomberg).

1-Month	+17.65%	1-Year	+57.89%
3-Month	+33.33%	3-Year	+34.96%
Year To Date	+185.71%	5-Year	+16.37%

United State of America

Here are the lists of funds collected for the study:

- ProFunds Short Precious Metals ProFund (SPPIX: US),
- ProFunds Short Precious Metals ProFund (SPPSX: US),
- Guggenheim Solar ETF (TAN: US),
- First Trust NASDAQ Clean Edge Green Energy Index Fund(QCLN:US), Firsthand Alternative Energy Fund (ALTEX:US),
- Direxion Daily Small Cap Bull 3X Shares (TNA: US),
- Goldman Sachs Government Income Fund(GSOBX:US),
- ProFunds Ultra Japan ProFund (UJPSX:US),
- ProFunds Ultra Japan ProFund (UJPIX:US),
- Power Shares DB Gold Double Short ETN (DZZ:US),
- Trading Emissions PLC/Fund (TRDGF:US)

With reference to the table below, TNA US Equity has the highest return in the list as an individual fund in the portfolio of us funds with a total return of 20.22% and DZZ US Equity ranks lowest in the list with a negative return of -34.89%.

Table 4.3: Table showing the total return on U.S Mutual fund investment (Source: Author's compilation).

	total return us										
	1	2	3	4	5	6	7	8	9	10	11
	TRDGF US	DZZ US Eq	UJPIX US E	UJPSX US I	GSOBX US	TNA US Eq	SPPIX US E	SPPSX US	TAN US Eq	QCLN US E	ALTEX US Equity
Starting from 1	1	1	1	1	1	1	1	1	1	1	1
2009	0.207379	-0.43627	0.141292	0.12933	-0.00066	0.393705	-0.43088	-0.43587	0.168757	0.423384	0.410211
2010	-0.09899	-0.43081	-0.16315	-0.17076	-0.00531	0.697306	-0.33825	-0.34421	-0.28498	0.02178	-0.09238
2011	-0.18328	-0.31767	-0.36468	-0.37238	0.028686	-0.38095	0.080617	0.072231	-0.63274	-0.41596	-0.3989
2012	-0.68222	-0.17906	0.480144	0.467583	-0.02205	0.426347	0.046032	0.038922	-0.30915	-0.01909	-0.2357
(1+x)	0.728945	0.651115	0.9735	0.96372	1	1.202181	0.807753	0.801225	0.67858	0.955406	0.875688
average return	-0.27105	-0.34888	-0.0265	-0.03628	0	0.202181	-0.19225	-0.19878	-0.32142	-0.04459	-0.12431

Summary of Direxion Daily Small Cap Bull 3X Shares (TNA:US)

Direxion Daily Small Cap Bull 3X Shares is an ETF fund situated in the USA. This fund invests minimum of 80% of its assets in equity securities comprising of Small Cap index. The aim of the Fund is to achieve a daily investment results gross fees and expenses.

- Fund Type: ETF
- Date of inception:05/11/2008
- Objective: Small-cap
- Asset Class: Equity
- Geographic Focus: U.S.
- Net asset value (30/08/2013): 52.1920

Table 4.4: Table showing the summary of Direxion Daily Small Cap Bull 3X Shares performance (Source: Yahoo Finance).

Performance Overview	
Year to Date Return (Mkt):	39.09%
1-Year Total Return (Mkt):	42.55%
3-Year Total Return (Mkt):	17.68%

Table 4.5: Table showing the summary of Direxion Daily Small Cap Bull 3X Shares performance (Source: Bloomberg)

Performance overview of TNA

1-Month	-9.83%	1-Year	+85.87%
3-Month	+7.31%	3-Year	+45.71%
Year To Date	+63.32%	5-Year	-
Expense Ratio	0.95		

Germany

List of Germany funds:

- ETFS Daily Leveraged Cotton (4RT5: GR),
- ETFS Daily Leveraged Nickel (4RUD: GR),
- ETFS Daily Leveraged Natural Gas (4RUC: GR),
- Lyxor ETF FTSE Athex 20 (LYXGRE: GR),
- E&G FONDS - Immobilienaktien Europa (HU4A: GR),
- Lyxor UCITS ETF EURO STOXX 50 Daily Leverage (LYXLVE: GR),
- iShares EURO STOXX Banks DE (SX7EEX:GR),
- Trinity Capital PLC/Fund (T7T: GR) and
- E&G FONDS - Immobilienaktien Europa (HU4B: GR)

Trinity Capital PLC/Fund (T7T: GR) has the highest average return compared to other funds in the portfolio over the years of study with a return of %28.5 while ETFS Daily Leveraged Natural Gas (4RUC: GR), has the least return in the portfolio with an approximate negative return of -74.5% .

Table 4.6: Table showing the total return on Germany Mutual fund investment (Source: Author's compilation)

	total return Germany									
	1	2	3	4	5	6	7	8	9	10
	4RUD GR E	4RT5 GR E	SX7EEX GF	4RUC GR E	LYXGRE GF	HU4A GR E	ZPJD GR E	LYXLVE GR	HU4B GR E	T7T GR Equity
Starting from 1	1	1	1	1	1	1	1	1	1	1
2009	1.654673	0.609682	0.529525	-0.84545	0.218324	0.221952	0.047184	0.462935	0.22097	0.722063
2010	0.434607	2.461466	-0.24252	-0.72353	-0.41653	0.063252	0.010174	-0.09776	0.035634	0.243594
2011	-0.50429	-0.45696	-0.35252	-0.73556	-0.61365	-0.02818	0.004317	-0.34968	-0.02829	0.186781
2012	-0.22946	-0.31	0.16418	-0.5977	0.19533	0.1465	0.045845	0.344246	0.123712	0.071364
(1+x)	1.098225	1.202041	0.966705	0.259654	0.756942	1.096888	1.02669	1.036427	1.08399	1.284573
x annual return	0.098225	0.202041	-0.0333	-0.74035	-0.24306	0.096888	0.02669	0.036427	0.08399	0.284573

Trinity Capital PLC/Fund (T7T: GR)

Trinity Capital PLC is a closed-end fund incorporated in the Isle of Man. The fund assets are focused in the real estate and securities relating to real estate, including infrastructure, throughout India. Investment returns is acquired from returns from development, long-term capital appreciation and income.

- Fund Class: Closed-End Fund
- Asset Class: Real Estate
- Geographic Focus: India
- Objective of fund: Physical Assets

Table 4.7: Table showing the summary of Trinity Capital PLC/Fund performance
Source: Bloomberg

Performance for T7T

1-Month	0.00%	1-Year	-18.37%
3-Month	-24.35%	3-Year	-19.19%
Year To Date	-28.10%	5-Year	-15.45%
Expense Ratio	-		

.

List of EMERGING MARKET Funds

- Energy and Petrochemical Index Fund (FAMEPIF: TB),
- Finansa Global Allocation Fund (FAMGAF:TB),
- Finansa Retirement Mutual Fund (BFMXRMF:TB),
- Global Emerging Market - Dividend Fund (INGTEMD:TB),
- Franklin Templeton Investment Funds - Templeton Emerging Markets Bond Fund (FT9A:GR),
- CCB Stable Growth Bond Fund (CCBSTAB:CH),
- Harvest Mid & Small Cap Growth Fund (LCTGROW:CH),
- HFT High Return Fund (HFHIRET:CH),
- National Bank of Egypt Fund I (NBEGYPA:EY) and
- NBE Fund VI (NBE6ACC:EY)

Energy and Petrochemical Index Fund (FAMEPIF: TB) has the highest return when compared to other funds data collated from emerging market. It has a return of 26.057% while NBE Fund VI (NBE6ACC: EY) ranks lowest with 4.58% as shown in the table below.

Table 4.8: Table showing the total return on Emerging Market fund (Source: Authors compilation).

	total return Emerging market									
	1	2	3	4	5	6	7	8	9	10
	FAMEPIF T	FAMGAF T	BFMXRMF	INGTEMD	FT9A GR E	CCBSTAB (	LCTGROW	HFHIRET C	NBEGYPA EY	NBE6ACC EY	Equity
Starting from 1	1	1	1	1	1	1	1	1	1	1	
2009	0.609706	0.342796	0.381884	0.203096	0.399479	0.08849	0.602815	0.458392	0.2642183	0.238211	
2010	0.610969	0.14639	0.247036	0.189032	0.065085	0.138147	0.290778	0.163443	0.05916442	0.024193	
2011	-0.13299	-0.1023	-0.10777	0.046895	-0.01381	0.050949	-0.1497	-0.18204	-0.1763721	-0.16816	
2012	0.123077	0.116667	0.168739	0.189269	0.169945	0.06749	0.06659	-0.00407	0.20592123	0.133719	
(1+x)	1.26057	1.11455	1.157809	1.155232	1.145169	1.085781	1.17038	1.084289	1.0738877	1.045755	
x annual return	0.26057	0.11455	0.157809	0.155232	0.145169	0.085781	0.17038	0.084289	0.0738877	0.045755	

Energy and Petrochemical Index Fund (FAMEPIF: TB): This is an open-end fund domicile in Thailand. The fund is aimed at achieving a medium to long term capital growth. 65% of the fund's asset is invested in equity securities. It major investment goes to securities of SET Energy & Utilities Index and SET Petrochemicals & Chemicals Index.

- Fund class: Open-End Fund
- Asset Class: Equity
- Geographical Focus: Thailand
- Objective of fund: Energy Sector

European Funds

List of European funds:

- Eurobank Equity Blend Fund of Funds (EUBGROW:GA)
- Oddo Asset Management - Eurofin Plus A (EUPLUSD:FP)
- VP Obligations Euro-Rendement (EURENDC:FP)
- Eurovalor Conservador Dinamico FI (EUVSMON:SM)
- Eurovalor Iberoamerica FI (EURVAIB:SM)
- Eurovalor Estados Unidos FI (EUROVUS:SM)
- AXA Investment Managers Paris – Europrogression (EURPROG:FP)
- AXA Investment Managers Paris – Europerspective (EURPERS:FP)
- Cartera Gestion Moderada FI (EURST30:SM) and
- Cartera Gestion Audaz FI (EURS100:SM)

Eurovalor Iberoamerica FI (EURVAIB: SM) has the highest return when compared to other funds data collected from European funds. It has a return of 20.66% while Eurovalor Conservador Dinamico FI (EUVSMON: SM) ranks lowest with 1.93% as shown in the table below.

Table 4.9: Table showing the total return on Europe mutual fund (Source: Author's compilation).

			total return Europe							
	1	2	3	4	5	6	7	8	9	10
	EUBGROW	EUPLUSD	EURENDC	EUVSMON	EURVAIB	EUROVUS	EURPROG	EURS100 S	EURPERS FP	EURST30 SM Equity
Starting from 1	1	1	1	1	1	1	1	1	1	1
2009	0.279198	0.117584	0.055501	0.014936	0.993635	0.274186	0.126511	0.245987	0.16673444	0.057341
2010	0.197605	0.083819	0.013765	0.008094	0.217356	0.207934	0.050787	0.154944	0.06552806	0.05231
2011	-0.10139	-0.05431	0.000917	0.019906	-0.20014	-0.00218	-0.02383	-0.06006	-0.0441609	-0.04533
2012	0.089217	0.129321	0.082262	0.034528	0.091964	0.075844	0.095886	0.108576	0.12457221	0.067596
(1+x)	1.106585	1.066476	1.037604	1.01932	1.206622	1.133756	1.060805	1.106587	1.0751703	1.031941
x annual return	0.106585	0.066476	0.037604	0.01932	0.206622	0.133756	0.060805	0.106587	0.0751703	0.031941

Eurovalor Iberoamerica FI (EURVAIB: SM)

Eurovalor Iberoamerica FI (EURVAIB: SM) is an open-end fund domicile in Spain. This fund's aim is directed towards capital appreciation. The Fund invests in international equity funds that are quoted in the emerging markets.

- Fund class: Fund of Funds
- Objective of the fund: Emerging Market Stock
- Inception date:18/09/2000
- Asset Class: Equity
- Geographical Focus: Latin American Region
- Net Asset Value: (on 2013-08-28) 277.63

Nigerian funds

List of Nigerian Funds

First Bank of Nigeria Heritage Fund (FBNHTFD: NL)

Lotus Capital Halal Fund (LOTCHLAL: NL)

Stanbic IBTC Ethical Fund (STANETH: NL)

Stanbic IBTC Guaranteed Investment Fund (STANGIN: NL)

Stanbic IBTC Nigerian Equity Fund (STANNEQ: NL)

With reference to the table below, Stanbic IBTC Guaranteed Investment Fund (STANGIN:NL) has the highest return in the list as an individual fund in the portfolio of funds with a total return of 7.789% and Stanbic IBTC Ethical Fund (STANETH: NL) ranks lowest in the list with a negative return of -7.323%.

Table 4.10: Table showing the total return on Nigerian mutual fund (Source: Author's compilation).

	total return NIGERIA					
	1	2	3	4	5	
	FBNHTFD	LOTCHLAL	STANETH	STANGIN	STANNEQ	NL Equity
Starting from 1	1	1	1	1	1	
2009	0.043098	0	-0.22951	0.166074	-0.14338	
2010	0.053189	-0.0241	0.12766	-0.01055	0.250359	
2011	-0.015	-0.08642	-0.31132	0.058668	-0.14918	
2012	0.206593	0.054054	0.232877	0.105176	0.272613	
(1+x)	1.06895	0.984587	0.926767	1.077899	1.03774	
x annual return	0.06895	-0.01541	-0.07323	0.077899	0.03774	

Stanbic IBTC Guaranteed Investment Fund (STANGIN: NL)

Stanbic IBTC Guaranteed Investment Fund is an open-end fund domicile in Nigeria. The Fund's objective is to realize a long-term capital appreciation. 75% of the Fund assets are directed towards investing in certain fixed income securities.

- Fund class: Open-end fund
- Asset Class: Fixed Income
- Geographical Focus: Global
- Objective of the fund: Foreign Aggregate Bond

4.2 Analysis

4.2.1 United Kingdom

4.2.1.1 UK Mutual Funds compared to FTSE 100

From the analysis carried out, the fund portfolio created with equal weight does not outperform the market when compared to FTSE 100.

The total return achieve in the portfolio of 10 funds, choosing 10 funds from 12 funds at random giving each fund the weight of 1/12 is 5.8% with standard deviation of 6.704%. The standard deviation represents the risk involved in investment of funds. The risk is quite high when compared to the expected return in this particular investment.

However, the FTSE 100 return of 7.65% and 11.85% risk in the market could be altogether risky too because the risk of 11.85% is almost double the risk involved in mutual fund. The reason for this is the volatility involved in the mutual fund management because the FTSE 100 would invest more in the banking sector which is plagued with higher risk than usual due to series of bank scam and new regulations affecting the banking sector.

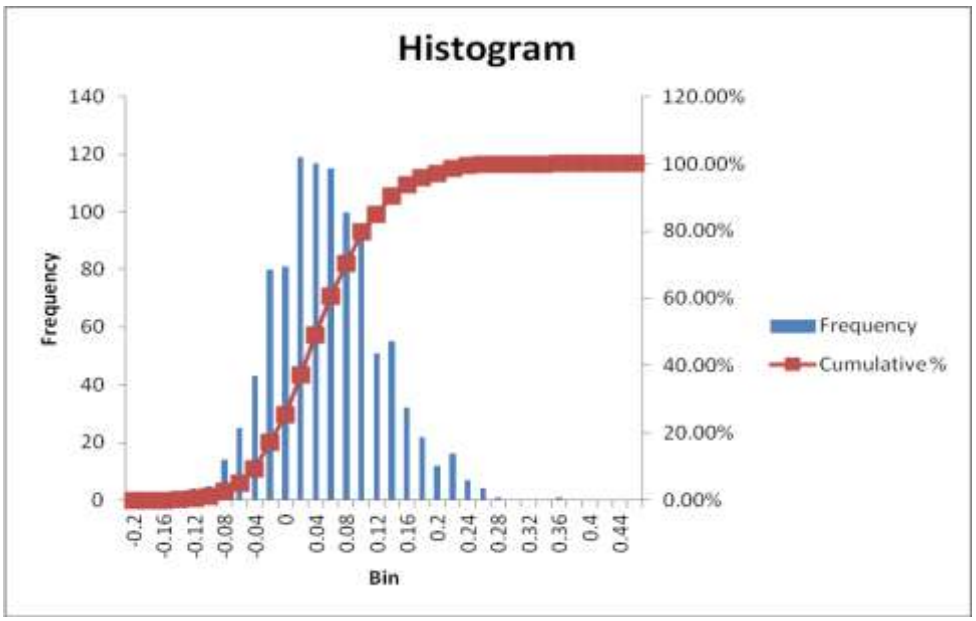

Figure 4.1: Graph showing the return of selecting 10 funds from 12 funds (10/12)

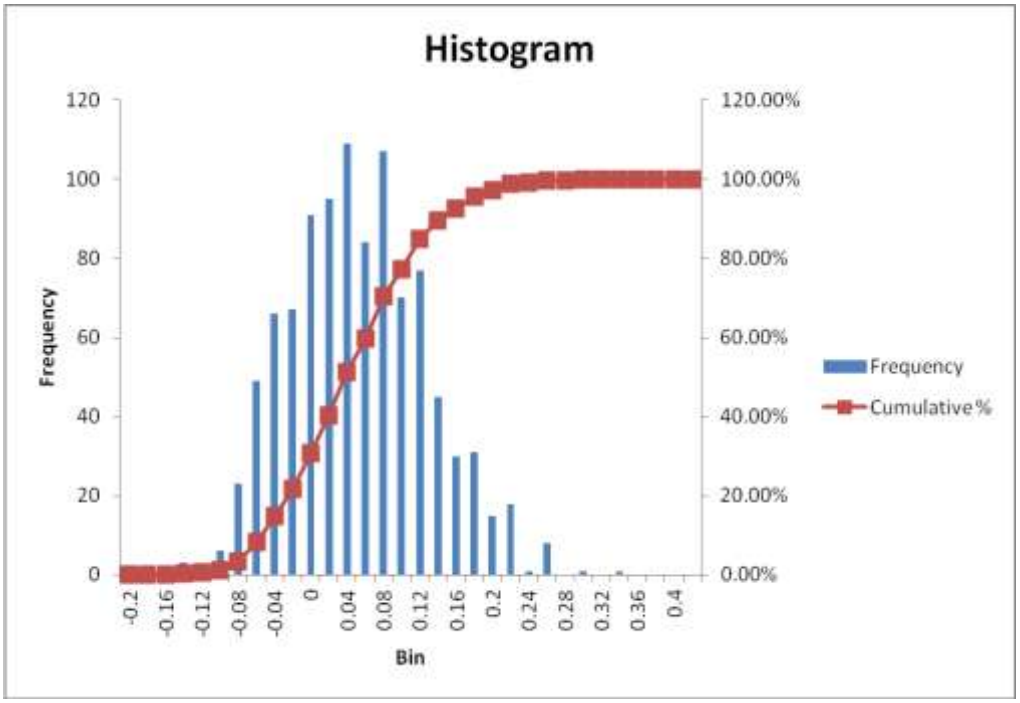

Figure 4.2: Graph showing the return of selecting 8 funds from 12 funds (8/12)

Note: The detailed analysis carried out on the funds leading the histogram can be found in appendix 8.

When fig 4.1 and fig 4.2 are compared, it is shown that the portfolio with 8 funds shows more defined irregularities in the graph above depicting higher volatility due to a smaller opportunity to diversify. This is well establishing in fig 4.3 showing the graph of a portfolio of four funds out of 12.

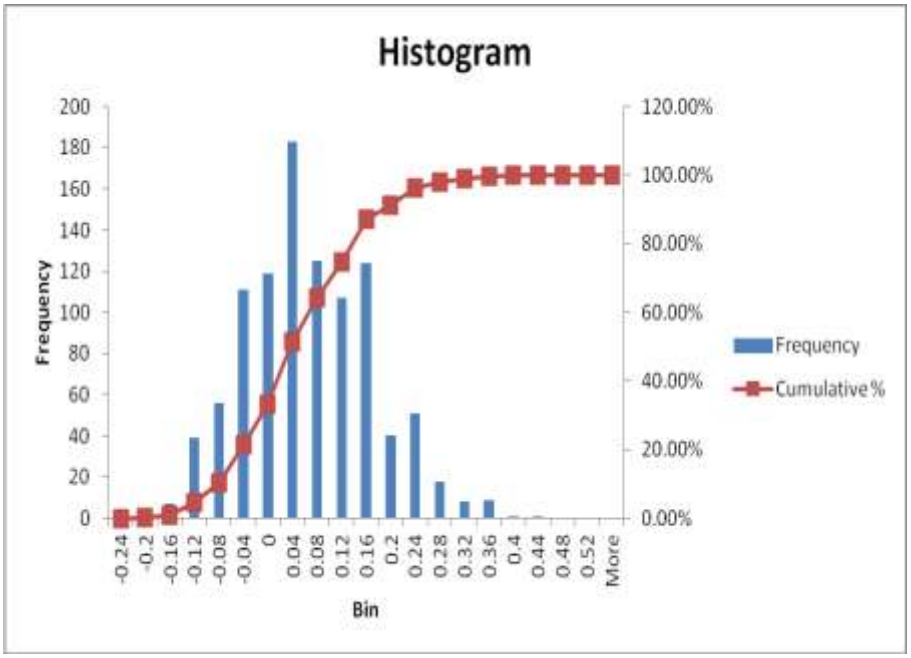

Figure 4.3: Graph showing the return of selecting 4 funds from 12 funds (4/12)

Nevertheless, only risk neutral investors who prefer higher return with no regards for the level of risk would prefer to invest in the FTSE 100 and not make use of a fund manager. Portfolio of 8 out of 12 funds is no better than that of 10 funds because it has a lower return and higher risk. This risk reflects the importance of diversification. The risk of 7.63% compared to 6.70% of the portfolio of 10 funds show the reduction in risk as a result of more funds/securities to invest in. This supports the Markowitz theory of diversification.

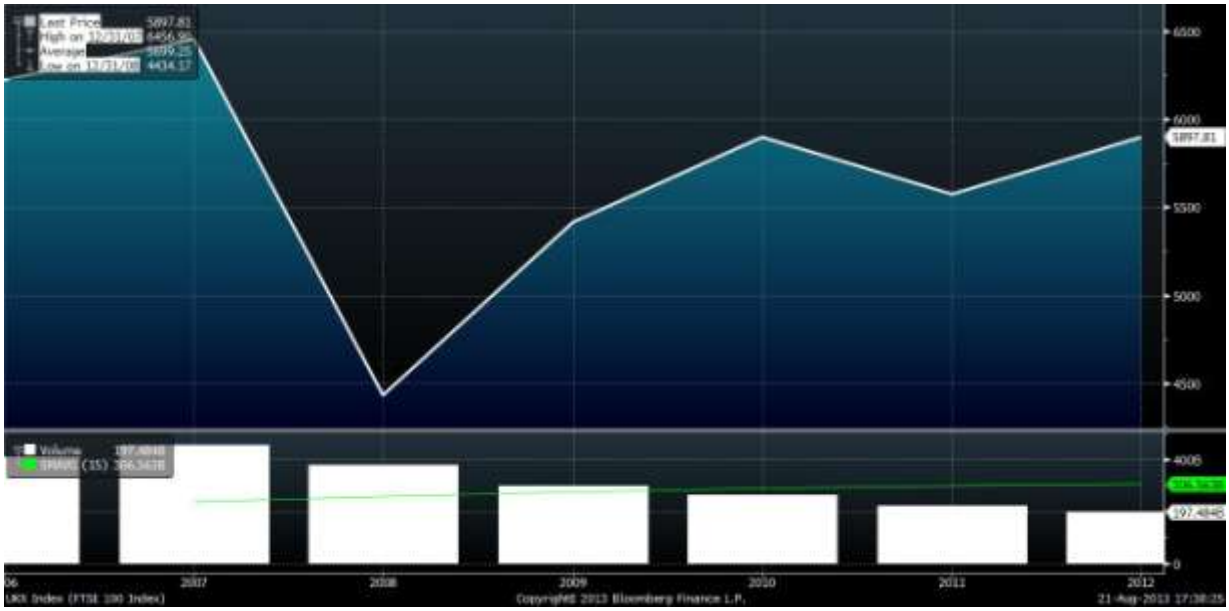

Figure 4.4: A graph that shows the trend of FTSE 100 RETURN from 2007 t0 2012 (Source: Bloomberg Finance LP (2013))

The graph depicts the volatility in the investment as the trend shows a zig zag form of movement. From the chart derived from Bloomberg it shows an increasing trend of FTSE 100 from 2009 to 2013, showing the post financial crisis effects. The trend in 2008 shows a sharp fall in the movement of FTSE 100 starting from 2007 towards 2008 as a result of the start of the global financial crisis. Despite, the high figure of risk, the movement of implied volatility have been steady from 2009, but it went very high in 2008.

4.2.1.2 FTSE 100 Compared to Oxford Technology Venture Capital Trust plc (OXT LN)

When we compare FTSE 100 to Oxford Technology Venture Capital Trust plc (OXT LN), we realize that the OXT LN alone beats the market or outperforms the market. This could be as a result of the funds of objective to create portfolio of selected and qualifying funds in order to achieve a maximized record. It invests in early stage companies with less aim to maximize return and establish itself in the market. OXT is invested globally providing a global source of diversification. With reference to table 4.1, OXT LN had its highest return of 85% in 2010, boosting the confidence of investors in mutual fund and fund managers. OXT LN has a risk of 27.8% which denotes a high risk for high return.

However, an investor will only take more risk only if the return is high.

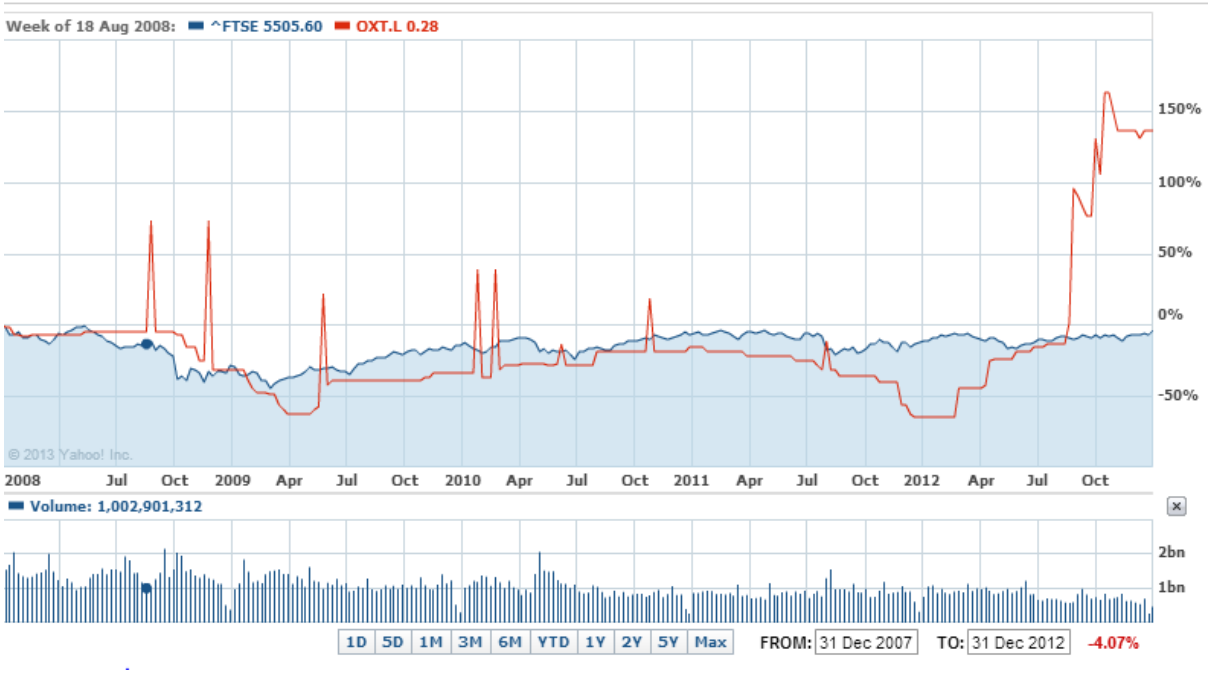

Figure 4.5: *Graph showing the comparison between the FTSE 100 and Oxford Technology Venture Capital Trust PLC (*Source: Yahoo Finance echarts (2013)).

4.2.2 United States Of America

4.2.2.1 United States Of America funds compared the S&P 500

After simulating 8 funds of 10 funds in the U.S.A, the funds result into a negative return of -0.12% and a standard deviation of 5.5%. This fund does not outperform the market when compared to the S & P 500 index. The S & P return is 14.36% which shows an outrageous difference between the two compared investments. However, the detailed analysis carried out on the funds leading the histogram can be found in appendix 9.

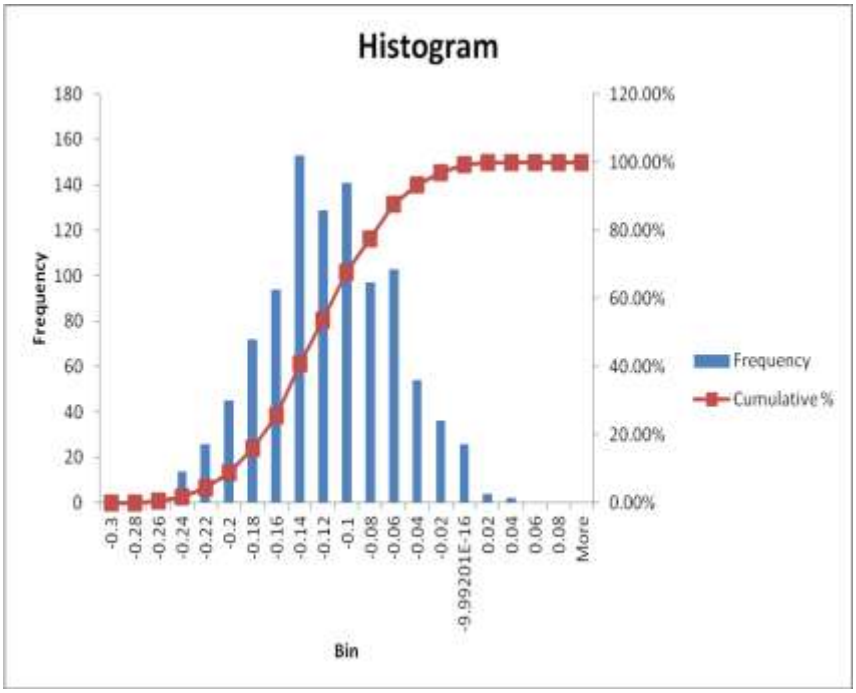

Figure 4.6*: Graph showing the return of selecting 8 funds from 10 funds (8/10)*

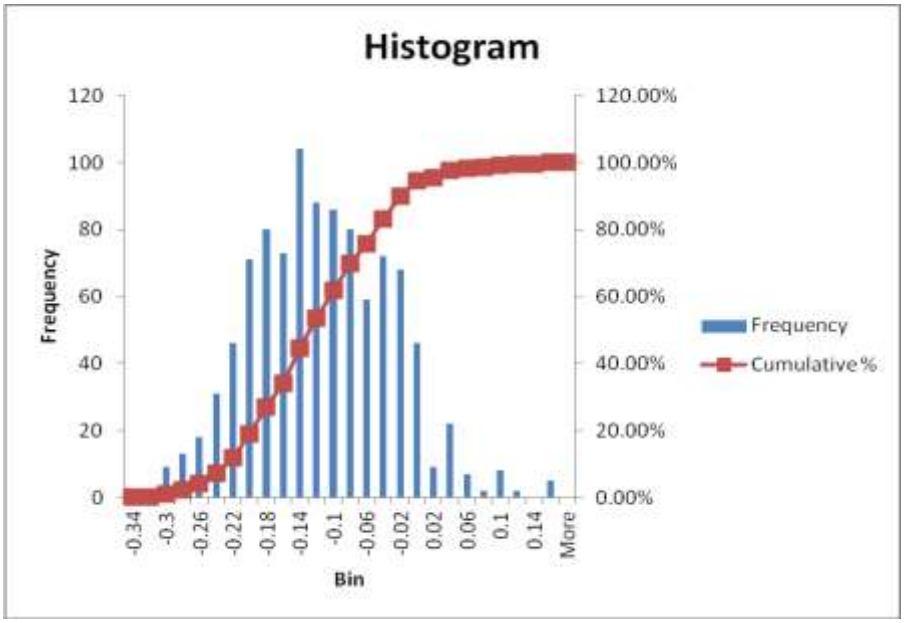

Figure 4.7*: Graph showing the return of selecting 4 funds from 10 funds (4/10)*

Despite the financial crisis that plugged the U.S.A government, the S&P 500 provides wider range of diversification of at least 500 securities to invest in. The mutual funds underperformance may be due to a lot of financial organizations failures and difficulty in rising after the global financial crisis.

Although, the risk involved in investment in the U.S.A stock market index is higher than the mutual fund portfolio, I will say the stock market index return is large enough to cushion any adverse effect, the risk/volatility might cause.

4.2.2.2 S& P 500 compared to Direxion Daily Small Cap Bull 3X Shares (TNA US)

The Direxion Daily Small Cap Bull 3X Shares (TNA US) mutual fund in itself outperforms the market. The fund managers have been able to achieve a total return of 20.22%, a difference of 5.86% when compared to the 14.36% of the U.S.A. The return on investment of TNA compared to the S&P 500 is relatively high as shown in the graph below. From the chart below the, the volatility of Direxion Daily Small Cap Bull 3X Shares is higher than that of the market.

Figure 4.8: *Graph showing the comparison between the S&P 500 and Direxion Daily Small Cap Bull 3X Shares (*Source: Yahoo Finance echarts)

4.2.3 GERMANY

4.2.3.1 Germany funds compared to DAX Index

The simulation of 8 funds from 10 funds with equal weights resulted in the underperformance of the mutual fund portfolio when compared to the DAX market index. The total return of mutual fund portfolio obtained over the years 2008 and 2012 yields a negative return of -5.34% totally to a less. The risk involved in this investment amounts to 5.5%.

In comparison to the mutual funds, the DAX index yields a total return of 12.16%. However, the return is accompanied with a high risk of 19.58%.

According to Markowitz, an inventor would only take on more risk if the return is higher.

Therefore, when comparing DAX index and Germany mutual fund, a reasonable investor would invest in DAX index despite its risk exposure. With regards to this analysis, an investment in a fund manager might not worth it. Therefore, an investment in individual funds might be a better choice for an investor.

The selection of four funds of 10 funds at random does not provide a higher return but it provides a higher risk. It results into a return of -5.68% and risk of 13.8%. This is due to less number of funds in the portfolio funds of funds and a reduced source of diversification. The graph of the simulation return shows an irregular distribution as shown in Figure 4.9 and figure 4.10.

However, the detailed analysis carried out on the funds leading the histogram can be found in appendix 10.

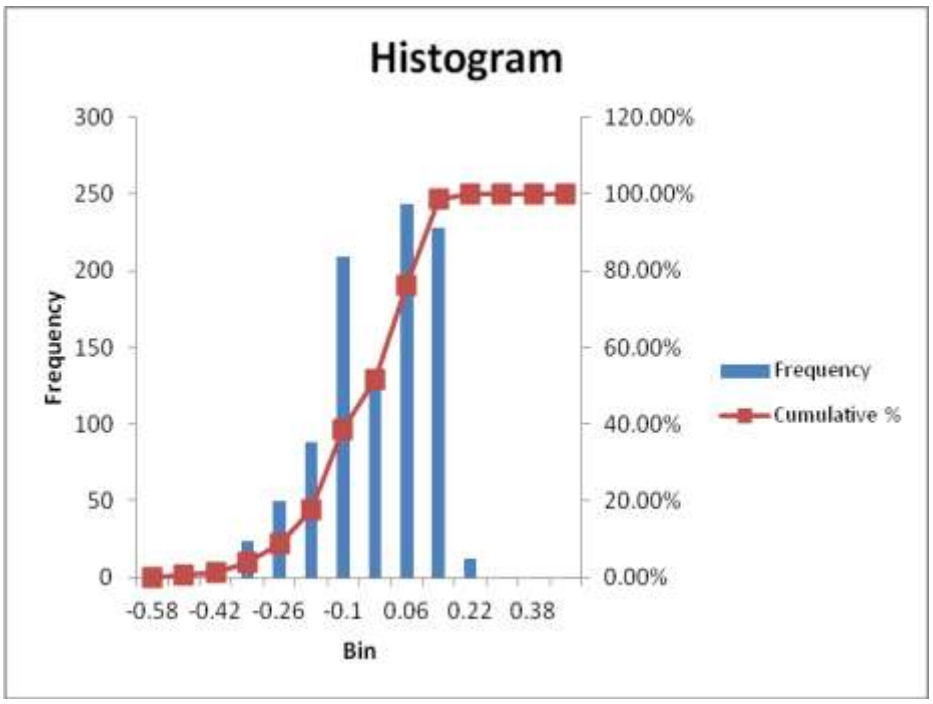

Figure 4.9*: Graph showing the return of selecting 4 funds from 10 funds (4/10)*

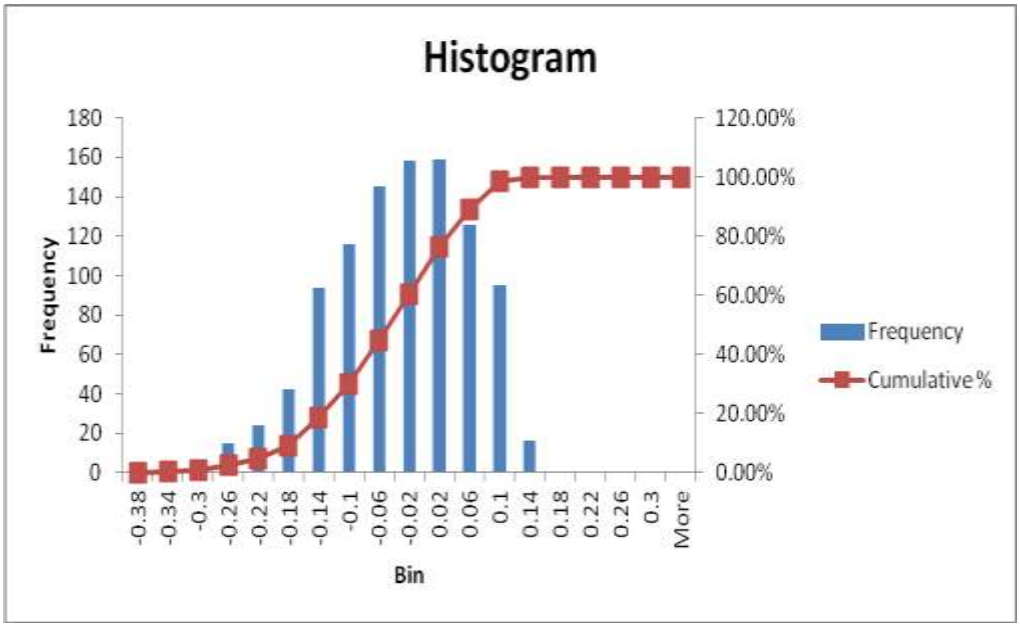

Figure 4.10*: Graph showing the return of selecting 8 funds from 10 funds (8/10)*

4.2.3.2 DAX Compared to Trinity Capital PLC (T7T)

In a further analysis, comparing the DAX index to the Trinity Capital fund PLC is the fund with the individual highest return before Monte Carlo simulation is applied to create a portfolio of equal weights. T7T has a return of 28.5% and risk of 28.65%. When compared to DAX, the risk exposure is higher the 19.58 standard deviation of DAX which represents its risk.

The fund's investment is directed towards estate related investments which yields high return in this present world but it is exposed to risk such as credit risk.

4.2.4 European Funds

4.2.4.1 European funds compared to MSCI Europe Index

The author went ahead to run an analysis on the European fund that contains top performing funds of different countries in Europe. The study was carried out in order to determine if the fund of different countries can outperform the European index.

The index used as a benchmark to compare the portfolio of fund is the MSCI European index. The return on MSCI Euro from 2008 to 2012 was calculated to be 12.53% and a standard deviation of 16.08%, the risk involved is quite high when compared to the total return an investor is likely to achieve from investing in the index.

Therefore, the insurgence of changes in regulation is a vital cause of the volatility in the market. The return realized from this analysis on the investment of mutual funds is 11.25% and a standard deviation of 1.892%.

Nevertheless, for a risk averse investor who wants to maximize return and minimize risk, the European fund portfolio will be the best choice. To a risk averse investor, the European fund outperforms the MSCI index. The outperformance is not reflected in higher return but it s reflected in the rate of minimized risk. This emphasizes the importance of fund manager's ability to minimize risk and avoid a total loss in the investment in a stock of a very high volatility.

As mentioned in above funds, the number of funds in a portfolio has a significant effect on the level of risk that can be minimized with the help of diversification. The charts below show the difference in the volatility of portfolio of 8 funds and that of 4 funds. The detailed analysis carried out on the funds leading the histogram can be found in appendix 11.

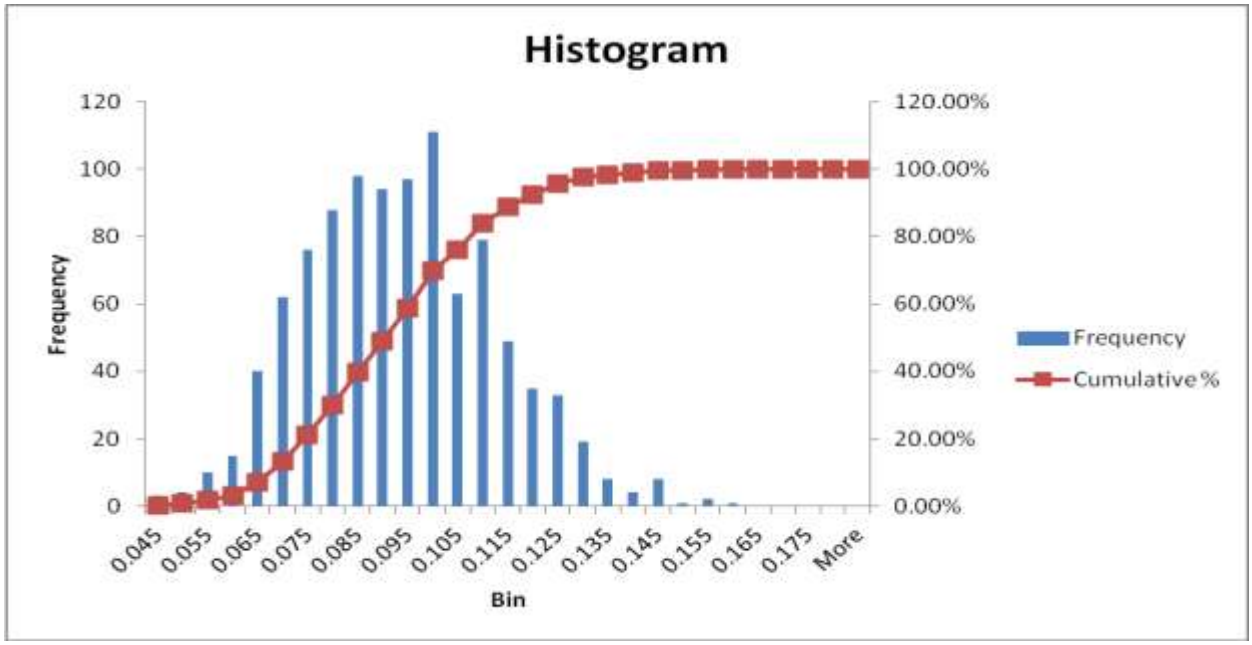

Figure 4.11*: Graph showing the return of selecting 8 funds from 10 funds (8/10)*

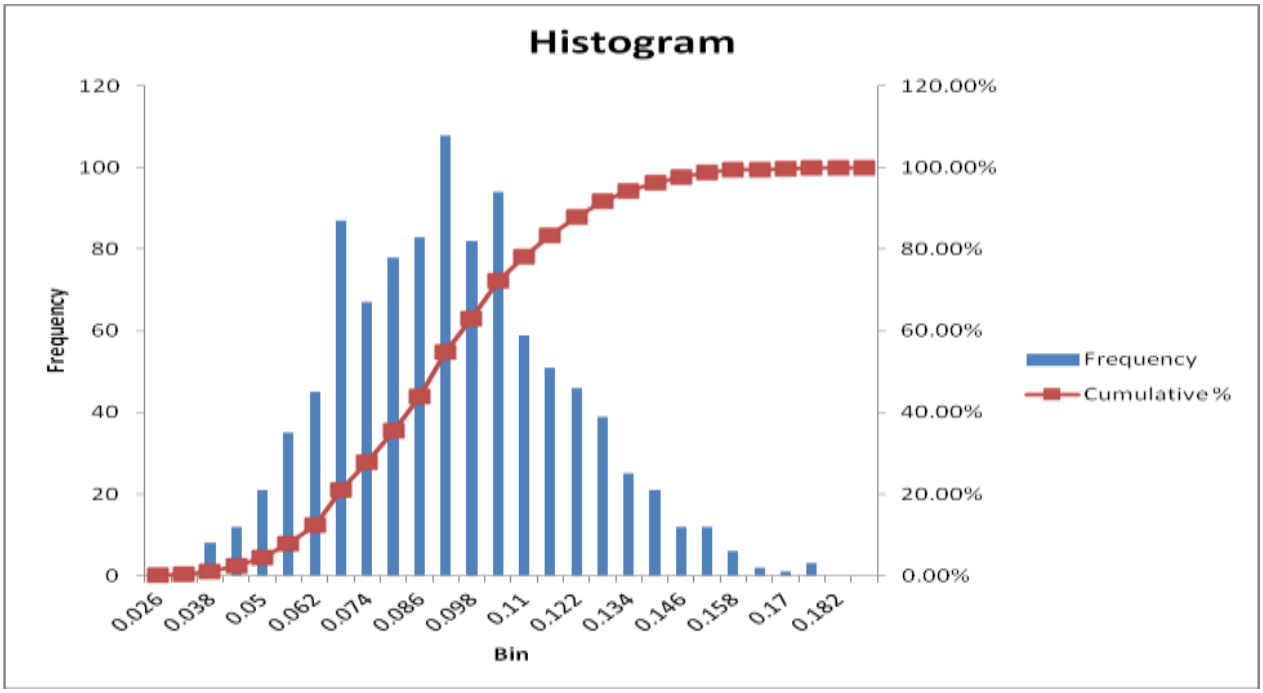

Figure 4.12*: Graph showing the return of selecting 4 funds from 10 funds (4/10)*

4.2.4.2 MSCI Europe compared to Eurovalor Iberoamerica FI (EURVAIB:SM)

The Eurovalor Iberoamerica FI (EURVAIB: SM) outperforms the MSCI Europe index with a return of 20.66% when compared to a return of 12.53% from 2008 to 2012. The EURVAIB: SM invests in international equities that are stated in the emerging markets. Although, it achieves a high return, the exposure to risk is high from its international investment. Most emerging market countries have relatively risky market composed of risky assets.

However, an investor/ fund manager whose sole objective is to maximize return irrespective of th risk involved, the EURVAIB: SM could be the an option.

4.2.5 EMERGING MARKET

4.2.5.1 Emerging market funds compared to MSCI EMERGING MARKET (MXEF)

On the basis of analysis carried out, the emerging market fund running a simulation of eight funds of ten funds at random 1000 times, the total return reached could not outperform the MSCI Emerging market index. Over the period of analysis the MSCI European index had a return of 19.78%, 5.95% higher than the return on the simulated portfolio of funds with a return of 13.86%. The author went further to apply simulation of four funds of ten at random and the analysis at a reduced total return of 9.05% and a higher risk of 2.57% because of the reduction in the number of funds in the

portfolio. However, the detailed analysis carried out on the funds leading to the figures mentioned can be found in appendix 12.

However the risk associated with an investment in the emerging market is very high at 39.65%, a rate which a risk averse investor might not want to bear.

Therefore, the emerging market fund appears to be more conducive for an investor because of a lower risk of 1.97% can be incurred at an expected return of 13.86%.

A fund manager' s ability to make the right choice in achieving his objectives of maximizing return and minimizing risk will come to play in this situation. An active fund manager who is risk averse would invest in the fund of funds while a risk neutral investor would invest in the market because it yields a higher expected return.

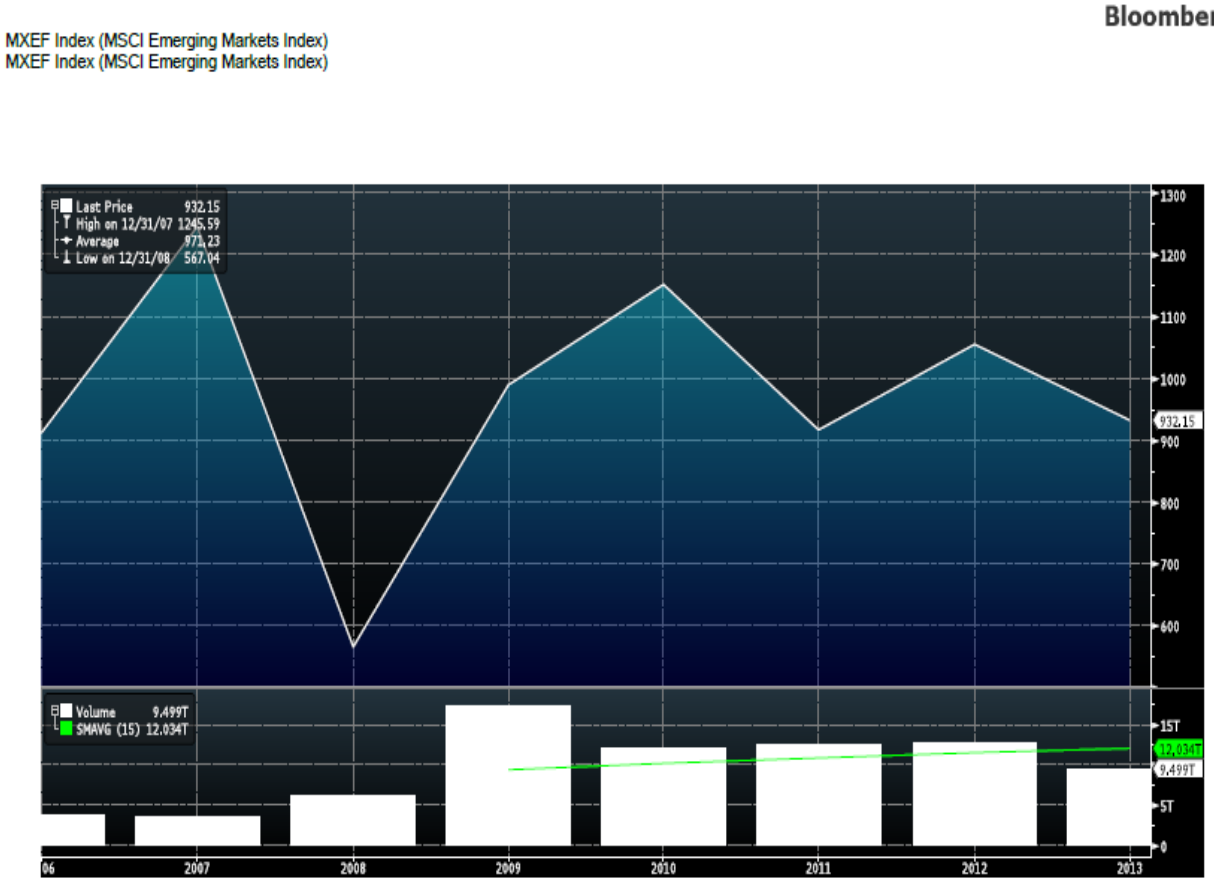

Figure 4.13: A chart showing the MSCI Emerging Market Index trend from 2007 to 2013(Source: Bloomberg Finance Charts).

Fig 4.1.3 shows the trend in MSCI Emerging Market Index revealing its drastic fall in 2008 after reaching its peak in 2007 leading to the popular financial crisis. This affected most of the companies in this index causing a reduction of the return by almost 50% in 2008. The market stated picking up

again 2009 and got to its highest in 2010 after the 2007 boom. There has been a steady up and down movement in the trend until recently in august 2013, when most market indices have dropped due to the government deliberating on an intervention I the crisis in Syria.

The risk associated with the Emerging market index could be high because of individual risk of different emerging market countries/developing countries owning assets in the index. An investment in the index exposes an investor to many risks outside the investor's nation. Most of these emerging markets are battling with various economics issues and regulations that do not favour the management of the companies in the emerging markets.

The mutual fund portfolio on the other hand has been able to maximize risk as a result of diversification in investing in qualified securities. The fund manager's skill in selecting securities with less risk has reduced the risk exposure of an investor in investing in the emerging market fund.

4.2.5.2 MSCI Emerging Market Index and Energy and Petrochemical Index Fund (FAMEPIF: TB):

The author went further to compare the MSCI emerging market index to Energy and Petrochemical Index Fund (FAMEPIF: TB), since FAMEPIF is the fund with the highest return in the sample data of mutual funds included in the portfolio. Within the period of analysis, FAMEPIF has a return of 26.06%, a figure that shows its outperformance of the market index whose return is 19.78%. FAMEPIF is able to outperform the market as a result of the fund manager's selection of securities and its investment in the energy and petrochemical industry. This industry is a component of industries providing a great source of revenues to countries whose economy depends on the trading on this sector.

In addition, the effect of diversification is confirmed in the histogram distribution representing the simulation of 8 funds out of 10 funds and the simulation of 4 funds from 10 funds is shown in the charts below.

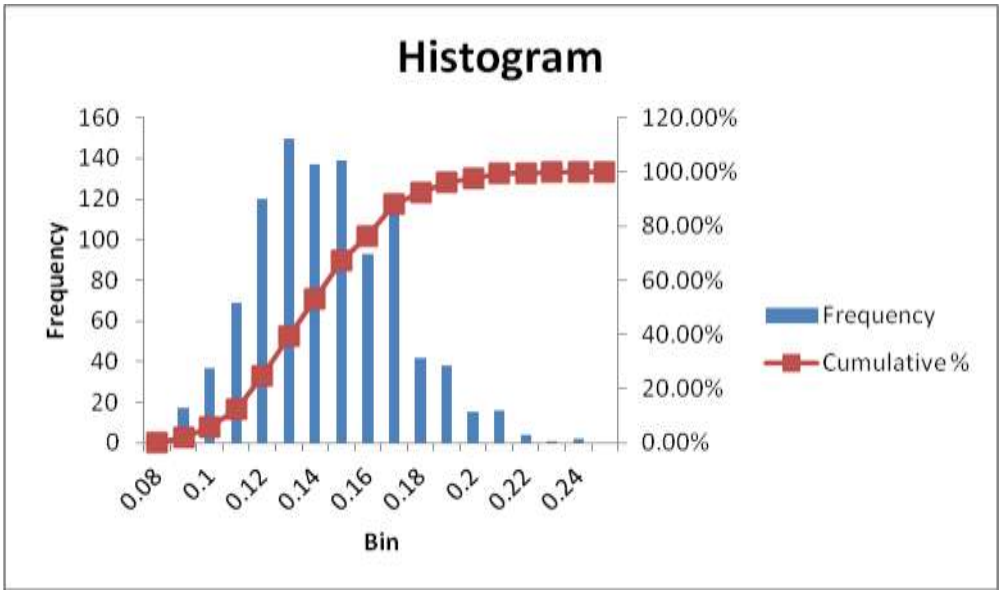

Figure 4.14*: Graph showing the return of selecting 4 funds from 10 funds (4/10)*

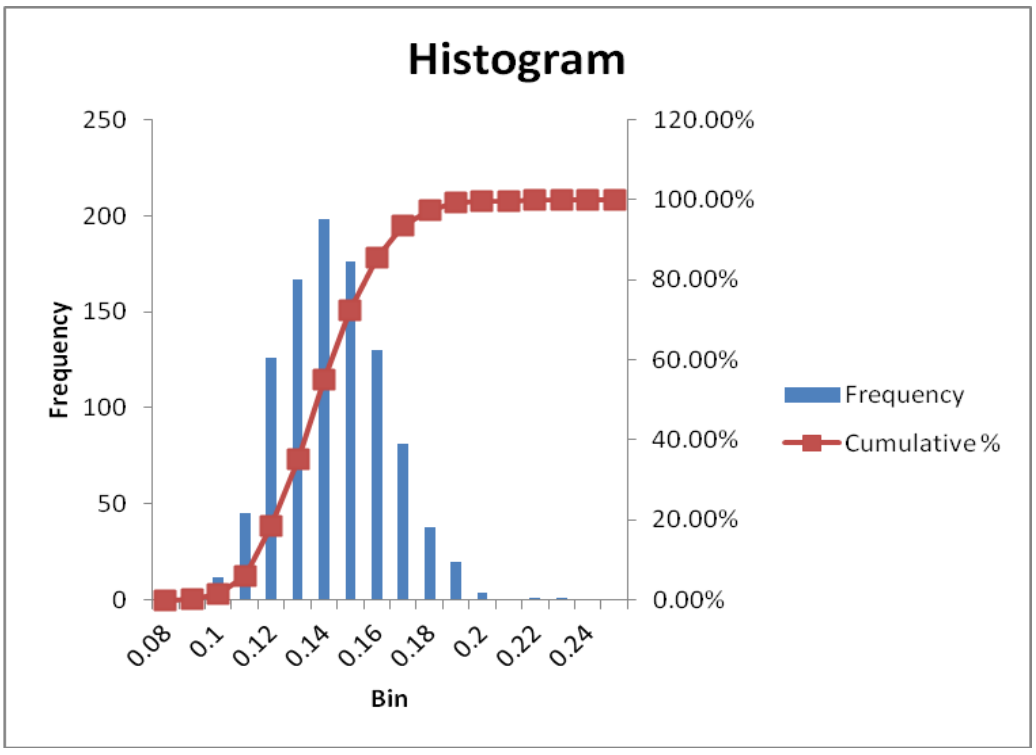

Figure 4.145*: Graph showing the return of selecting 8 funds from 10 funds (8/10)*

Therefore, this fund took advantage of skills of the manager on security selection on the basis of the sector allocation of funds. The standard deviation of investing in FAMEPIF is lower than that of investing in the emerging market.

Finally, it is better to invest in the mutual fund portfolio than the market index even though the fund does not outperform the market. It is less risky than the market index and could be suitable for a risk averse investor.

4.2.6 NIGERIA

4.2.6.1Nigeria Mutual Fund Compared to Nigerian Stock Exchange Index (NGSEINDX)

The result of the analysis shows that the mutual fund portfolio of five best performing fund selecting four out of five funds to each simulation giving each fund equal weights of investment outperformed the market. The total return arrived at is 1.492% at a risk of 2.186% compared to the return of -0.4% on the Nigerian Stock exchange all share index (NGSEINDX) and a risk of 33%. A detailed analysis carried out on the funds can be found in appendix 13.

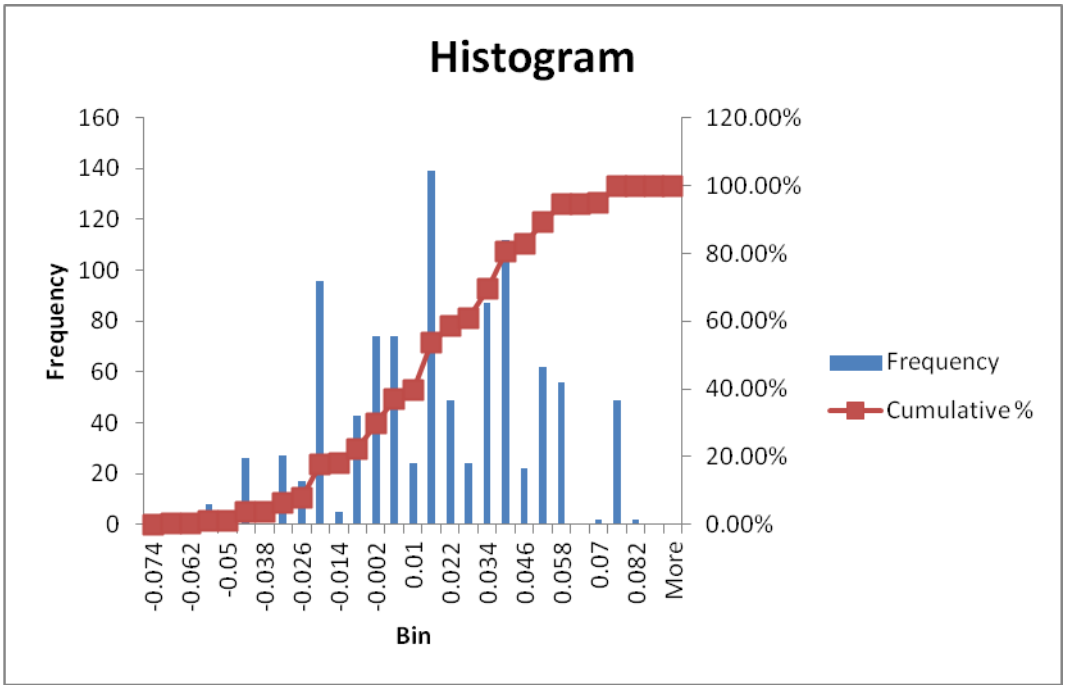

Figure 4.16*: Graph showing the return of selecting 4 funds from 10 funds (4/10)*

The risk in the stock market is very high when compared to the expected return due to the instability in the stock market and the economy as a whole in the nation.
Furthermore, companies are facing hard times in the region affected by terrorist attacks and others are exposed to risk of loss from these attacks.

The use of a fund manager will help to allocate funds in areas of lesser risk and opportunities of great returns. With reference to the table in appendix 6, the table summary of Nigerian index total return, the return on investment in the stock market started falling from 2008 till 2012 when it started picking up. This could be attributed to the global financial crisis and the insurgence of the Boko Haram sect (the terrorist group) at that time. Although, the country is still battling with the issue, the economy has been able to reach a point of stability in its economy outgrowing the shocking effect of the attacks. Investors on the other hand have reduced investment that might be affected by these attacks thereby reducing the adverse effect of risk of losing their assets.

Consequently, the importance of a fund manager cannot be over emphasized in this situation since most individual investors do not have access to information in the market that might guide an individual investor in investment decisions.

4.2.6.2 Nigerian Stock Exchange Index (NGSEINDX) Compared to Stanbic IBTC Guaranteed Investment Fund (STANGIN: NL)

The individual fund from the portfolio Stanbic IBTC Guaranteed Investment fund (STANGIN:NL) outperforms the market with a return of 7.79% compared to the negative return of 0.4% on the index.

STANGIN is an open ended fund that is directed towards a long term capital investment. The fund invests over 75% of its assets into selected fixed income securities. This takes active fund manager skills in other to achieve a return that is able to outperform the market.

Therefore, an active fund manager will invests a higher percentage of the fund into the Stanbic IBTC Guaranteed Investment fund.

4.2.7 Key Conclusion From The Analysis

From the above stated hypothesis, the analysis can conclude that it is possible to outperform the market although according to this analysis, an equal weighing might not favour the performance of the fund.
The United Kingdom's fund, USA, Germany, European funds, and the Emerging market funds could not outperform the market. Although, these funds did not outperform the market, a risk averse investor might prefer to

invest in such funds using a fund manager because of the high risk accrued to the expected return of most indices. However, the Nigerian mutual fund portfolio outperformed the Nigerian stock exchange index.

From the analysis, the results show that the stock market exposes investors to more risk than the mutual fund poses. The diversification effect is emphasised in the difference in return of portfolios with more funds than the ones with less funds. The importance of diversification is revealed when the risk exposure in investing in a portfolio of funds with four funds of ten funds is higher than that of eight funds in a portfolio as shown in the United Kingdom mutual funds.

Therefore, the diversification in funds helps to increase the performance of funds. The summary of the mutual fund performance data can be seen in the table below.

Table 4.11: Table showing the result of the analysis according to each simulation.

Country	Assumption (funds)	Return (%)	Risk (%)
UK	10 from 12	5.8	6.704
	8 from12	4.221	7.63
	4 from 12	4.67	10.39
USA	8 from 12	-0.12	5.5
	4 from 12	-12.46	8.2
Germany	8 from 12	-5.34	9.31
	4 from 10	-5.68	13.8
Europe	8 from 10	11.25	1.8915
	4 from 10	9.05	2.57
Emerging market	8 from 10	13.86	1.97
	4 from 10	13.95	2.68
Nigeria	4 from 5	1.492	2.186

Table 4.12: Table of benchmark index

Index	Return (%)	Risk (%)
FTSE 100 (UK)	7.65	11.85
S & P 500 (USA)	14.36	9
Germany	17.16	19.58
MSCI (Europe)	12.53	16.08
MSCI Emerging market	19.78	39.65
NGEINDX (Nigeria)	-0.4	33

Chapter 5 Conclusion

5.1 Introduction

The study on mutual fund performance and the need for fund managers cannot be overemphasized as a result of the rapid expansion of the mutual fund market both in the developed and developing nations all over the world.

Aside its growth, the need for returns by investors in the world and the importance of economic growth from constant trading in the market has placed the study of mutual fund an important matter.

The massive number of mutual funds poses a difficulty in the choice of investment by investors. Studies carried on investment suggest that the more the numbers of choices of funds/securities, the more likely it is to make more informed decisions. However, other studies emphasizes that the more available choices an investor is required to make, the more complicated decision process becomes. This can be incapacitating. This and other reasons add up to an investor experiencing challenges or difficulties in making correct decisions.

Therefore, potential investors in the market are sceptical about the choice of asset to include in their portfolio as a result of the volatility in the financial market. Despite all the ability of risk fund managers to eliminate risk, it seems investment risk has come to stay. This study appraises portfolio fund performance using the Monte Carlo simulation model attuned to fit into the present day financial market which is as prone to failure as it is in the past.

Fund Manager Performance

Here, for each sample of mutual fund separated into countries, the major indicator of funds are simulated over time, the value of return and risk of each portfolio is calculated and the portfolio values are represented in histogram.

The study carried out to appraise the importance of a fund manager in outperforming the market however concludes that fund managers will perform better if their objective is aimed at maximizing fund return rather than attempt to minimize risk or the volatility. This entails investment in the stock market with high expected returns.

Second, these results implies that specific fund can outperform the market and portfolio managers could invest a higher percentage of their assets on funds of high returns or invest in securities these funds invest in. These

results also implies that the use of equal weighting in portfolio selection might not be 100% safe, therefore, the mean variance approach to distributing weight of assets using the excel solver can be also included in the fund managers fund selection and investment process.

Third, the use of a fund manager in the investment of fund cannot be overemphasized as the mutual fund market requires a thorough study before an investment can be made.

The rationale behind this conclusion is based on the fact that volatility of the fund is less than that experienced in market, giving a considerable solution to the risk exposure in the market. The difference in the standard deviation obtained in the stock markets and that of the fund portfolio shows the importance of diversification in minimizing the diversifiable risk. Hence, diversification in funds has a tremendous effect in the reduction of risk.

However, to a large extent, diversification effect cannot be established in systematic risk. The choice of investment, either in the mutual fund portfolio or the stock market depends on the level of risk tolerance of an investor.

In conclusion, the portfolio risk management theories, that is, Monte Carlo simulation theory and the mean variance approach together would solve the dilemma a risk-averse investor faces in selecting the fund portfolio which either on the long run or the short run would yield a maximum return at a minimum risk. Therefore their importance cannot be overemphasized. These theories have maintained their popularity over the years and decline in its popularity is unlikely as long as investment decisions are made.

5.2 Recommendation

From the findings of this research, this study came up with recommendations to improve the effectiveness of fund managers and the return on investment.

Recommendation to Individual Investors

An individual investor should select a fund according to its objective and the investor's requirement from the fund.

Knowledge they say is power, an investor should request knowledge of the fund/market they are investing in. This can be achieved by following the trend in the market by listening to the global news, since globalization has placed the market in an intertwined form where events in the nation or internationally can affect the expected returns of the market globally. For

example, the issue of Syria intervention that has not yet been confirmed as at the carrying out of this research has caused a drop in all the major indices across the world.

However, an active investment involving an investment manager might be safe from the adverse effect on investment as portfolio of assets is created according to the trend and study of the market. This brings us to the next point

An investor might require the help of a fund manager in the investment of fund because understanding the market and the financial jargon used in the market might be difficult for an ordinary investor. A fund manager would be handy in a world where an unexpected event that affects investment has not seized to occur. A fund manager finds it easier to adjust his portfolio in accordance to events and with the use of skills and experience earned on the job.

However, no matter the depth of trust an investor might have in a particular market or investment, It is not advisable for any investor whatsoever to invest 100% into any form of investment either in the stock market or in mutual funds because of the uncertainties involved in any form of investment.

Recommendation to fund manager

From the findings of this research, it is recommended to a fund manager to carry out an all round examination on the securities to invest a fund in and in creating a fun of funds, the fund manager should study the funds with respect to the external factors that might factor the funds and the internal factors.

Knowledge: As the world keeps changing, a fund manager is required to keep improving his skills and research has the market keeps improving.

It is also recommended of the fund manager to build trust with client by improving on transparency in other to gain investors trust.

In this case, a fund manager should carry out SWOT ANALYSIS on the fund or securities in question that is, examine, the strength, weakness, Opportunities and Threats.

Strength: The strength of a security or fund re those internal factors accruing to the organizations positive performance. This could be the type of industry the security belongs to or the cost of investing in the security of funds or a historical success of the investment in question. When the strength is realized a fund manager is expected to capitalize on this strength in other to maximize profit.

Weakness: The fund manager should not stop at analysing the strength of an investment but the weakness too in other to minimize the risk involved in

investing in such securities or fund. An example of such weakness, are regions of the world that are prone to crisis that can shut down the economy or industries that are prone to commercial strike that can slow down the growth of an organization, all resulting into a poor return.

Opportunies: These are external factor affecting the performance of a fund. These are factors that a fund manager does not have power over. This could be explained in terms of arbitrage opportunities that can be taken advantage of in the market. It could also be an expansion in the sales of goods sold by one of the companies a fund is invested in. The ability of a fund manager to seize the opportunities in the market as it occurs shows the strength of a fund manager's performance.

Threat: This is another form of external factor that cannot be controlled by a fund manager but fund can be managed in accordance to it. Examples of factors that threaten the performance of funds and other investments are inflation and government policies on trade or industries.
The above mentioned recommendations are suggested by this study as mutual fund investment has more advantage in the economy than its disadvantages.

BIBLIOGRAPHY AND APPENDICES

REFERENCES

Books:

Bodie, Z., Kane, A., and Marcus, A. (2011) *Investments and Portfolio Management.* 9th Global edition. New York: Mc Graw Hill Companies.

Bodie, Z., Kane, A., and Marcus, A. (2008), *Essentials of Investments.* 6th International Edition. New York: Mc Graw Hill Companies.

Bodie, Z., Kane, A., and Marcus, A. (2008) *Investments.* 8th Edition. New York: Mc Graw Hill Companies.

Brindley, B. (2008) *A dictionary of finance and banking*, 4th edition, Oxford, New York: Oxford University Press.

David Hillier et al, (2010) *Corporate Finance*, First European Edition, New York: Mc Graw Hill Educaton.

Pilbeam, K. (2010). *Finance and Financial Markets* (3rd Edition.) Hampshire: Palgrave Macmillan Limited.

Journals and Articles:

Boyle, Phelim P. (1977), "Options: A Monte Carlo approach". *Journal of Financial Economics*, Retrieved 2010-09-24, Volume: 4 (1977), pp. 323–338.

Carhart, Mark (1997), ''Persistence in mutual fund performance'', *Journal of Finance* 52, pp. 57–82.

Chen Z., Lai, T.L. and Xing, H. (2011) ''Mean-variance portfolio optimization when means and covariance are unknown'', *Annals of Applied Statistics*, vol. 5, no. 2A, pp. 798-823.

Chen Z. et al (2012), ''Does Portfolio Emulation outperform its Target funds?'' FIRN Research Paper. Available at SSRN: http://ssrn.com/abstract=2139195

Demissew and Raja Nag, (*2009*) ''Managerial Tenure And Mutual Fund Performance: Evidence From Index Funds'', *Journal of Business & Economics Research –Volume 7, Number 5, pp103-111*

Gallagher et al (2013) ''Portfolio Quality and Mutual Fund Performance'', *FIRN Research Paper. Available at SSRN: http://ssrn.com/abstract=2151658*

Grinblatt, M. and Titman, S. (1989), "Portfolio performance evaluation: old issues and new insights", *Review of Financial Studies,Vol. 2,* no. *3.*

Grinblatt, M. and Titman, S. (1992), "The persistence of Mutual Fund Performance", *The Journal of Finance, Vol. XLVII,* no. 5.

Grinblatt, M. and Titman, S. (1993), "Performance Measurement Without Benchmarks: An Examination of Mutual Fund Returns*", Journal of Business, Vol. 66, no. 1.*

Huang, Sialm, and Zhang (2011) ''Risk Shifting and Mutual Fund Performance'', *The Review of Financial Studies /v 24 n 8*

Kryzanowski and Rahman,(2008), ''Portfolio performance ambiguity and benchmark inefficiency revisited'' *Journal of Asset Management, Vol. 9, 5, pp 321–332*

Myle, E.M. (2013) ''A Simplified Perspective of the Markowitz Portfolio Theory'', *Global Journal of Business Research*, vol. 7, no. 1, p. 59-67.

Sharpe, W. F (1966*),* "Mutual Fund Performance*", The Journal of Business, pp. 119- 138*

Stavley j. Kon and frank c . Jen,(1978) ''Estimation of time-varying systematic risk and performance for mutual fund portfolios: An Application of Switching Regression, *The journal of finance vol, xxxtll. No. 2*

Sweta, Mukta and Rahul (2012), ''A Review Of Performance Indicators Of Mutual Funds, *Researchers World -Journal of Arts, Science & Commerce*, www.researchersworld.com Vol.–III,Issue–4(1),October 2012

Wermers, R. (2000), "Mutual Fund Performance: An Empirical Decomposition into Stock Picking, Talent, Style, Transaction Costs and Expenses*", the journal of finance, Vol. 4, No. 4.*

APPENDICES

APPENDIX 1: TABLE SUMMARY OF FTSE 100

FTSE 100 (pounds)				
FTSE100 INDEX				
Date	TOT_RETURN_INDEX_GROSS_DVDS	Return		
31/12/2008	4392.68			
31/12/2009	5412.88	0.23225		
31/12/2010	5899.94	0.089982		
30/12/2011	5572.28	-0.05554		
31/12/2012	5897.81	0.05842		
	(1+x)	1.0764		
	x annual return	0.076441		

APPENDIX 2: TABLE SUMMARY OF S&P 500

S&P 500 INDEX(USA)		
SPX Index	500	
Date	TOT_RETURN_INDEX_GROSS_DVDS	Return
31/12/2008	903.25	
31/12/2009	1137.4	0.2592
31/12/2010	1305.9	0.1482
30/12/2011	1333.2	0.0209
31/12/2012	1544.9	0.1588
	(1+x)	1.1436
	x annual return	0.1436

APPENDIX 3: TABLE SUMMARY OF DAX

DAX INDEX(GERMANY)			
DAX Index			
Date	TOT_RETURN_INDEX_GROSS_DVDS	Return	
31/12/2008	4810.2		
31/12/2009	5957.4	0.2385	
31/12/2010	6914.2	0.1606	
30/12/2011	5898.4	-0.147	
31/12/2012	7612.4	0.2906	
	(1+x)	1.1216	
	x annual return	0.1216	

APPENDIX 4: TABLE SUMMARY OF MSCI EMERGING MARKET

EMERGING MARKET INDEX(dollar)			
MXEF Index			
Date	TOT_RETURN_INDEX_GROSS_DVDS		
31/12/2008	567.04		
31/12/2009	1009.2	0.7797	
31/12/2010	1200.1	0.1892	
30/12/2011	986.52	-0.178	
31/12/2012	1167.4	0.1833	
	(1+x)	1.1978	
	x annual return	0.1978	

APPENDIX 5: TABLE SUMMARY OF MSCI EUROPE MARKET

EUROPEAN INDEX(euro)			
MXEU Index			
Date	TOT_RETURN_INDEX_GROSS_DVDS	Return	
31/12/2008	69.43		
31/12/2009	91.363	0.3159	
31/12/2010	101.93	0.1157	
30/12/2011	94.608	-0.072	
31/12/2012	111.32	0.1766	
	(1+x)	1.1253	
	x annual return	0.1253	

APPENDIX 6: TABLE SUMMARY OF NIGERIAN STOCK EXCHANGE INDEX MARKET

NIGERIA STOCK EXCHANGE INDEX(naira)			
NGSEINDX Index			
Date	TOT_RETURN_INDEX_GROSS_DVDS	Return	
31/12/2008	31447		
31/12/2009	20858	-0.337	
31/12/2010	25612	0.2279	
30/12/2011	22309	-0.129	
31/12/2012	30958	0.3877	
	(1+x)	0.9961	
	x annual return	-0.004	

NOTE: DOUBLE CLICK ON THE EXCEL ICON TO OPEN WORKSHEET

APPENDIX 8: EXCEL WORKBOOK OF MONTE CARLO SIMULATION ON UK FUNDS

1. 4FUNDS FROM 12 FUNDS

4 Portfolio fund uk.xls

2. 8 FUNDS FROM 12FUNDS

8 Portfolio fund of funds UK .xls

3. 10 FUNDS FROM 12 FUNDS

10 portfolio asset UK.xls

APPENDIX 9: EXCEL WORKBOOK OF MONTE CARLO SIMULATION ON USA FUNDS

1. 4FUNDS FROM 10 FUNDS

4 PORTFOLIO FUND USA.xls

2. 8 FUNDS FROM 10 FUNDS

8 Portfolio fund USA.xls

3. 10 FUNDS FROM 11 FUNDS

10 Portfolio fund US.xls

APPENDIX 10: EXCEL WORKBOOK OF MONTE CARLO SIMULATION ON GERMANY FUNDS

1. 4FUNDS FROM 10 FUNDS

4 Portfolio fund Germany.xls

2. 8 FUNDS FROM 10 FUNDS

8 Portfolio fund Germany.xls

APPENDIX 11: EXCEL WORKBOOK OF MONTE CARLO SIMULATION ON EUROPEAN FUNDS

1. 4FUNDS FROM 10 FUNDS

4 Portfolio fund EU.xls

2. 8 FUNDS FROM 10 FUNDS

8Portfolio fund EU.xls

APPENDIX 12: EXCEL WORKBOOK OF MONTE CARLO SIMULATION ON EMERGING MARKET FUNDS

1. 4FUNDS FROM 10 FUNDS

4Portfolio fund Emerging market.xls

2. 8 FUNDS FROM 10 FUNDS

8Portfolio fund Emerging market.xls

APPENDIX 13: EXCEL WORKBOOK OF MONTE CARLO SIMULATION ON EMERGING MARKET FUNDS

1. 4FUNDS FROM 5 FUNDS

4 portfolio fund NIGERIA.xls

.